ARCHIVES OF OPHTHALMOLOGY.

DISTORTIONS OF THE VISUAL FIELDS IN CASES OF BRAIN TUMOR.

(*Third Paper.*)

BINASAL HEMIANOPSIA.

BY HARVEY CUSHING AND CLIFFORD B. WALKER,
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THE former papers in this sequence[1] were based on the studies of a consecutive series of 200 patients with intracranial growths observed in the Johns Hopkins Hospital between June 18, 1905, and January 1, 1911. Since they were written the additional cases of tumor which have come under observation bring the number to an even 300 on May 1, 1912.

In the first series of 200 cases it was stated that actual hemianopsia, or a tendency toward hemicircular defects in the fields either for form or color, was observed in 42 of the 123 cases in which reliable perimetric tests were permissible. In other words, hemianopsias characterized 34 per cent. of all cases showing perimetric deviations.

In the more recent 100 cases there has been a disproportionate increase in the number of patients with hypophysial growths directly involving the chiasm. Hence the number of examples of homonymous or bitemporal field defects,[2] asso-

[1] Cushing and Heuer: First paper, "Statistical Studies," *Bull. Johns Hopkins Hospital*, 1911, xxii., 190–195; second paper, "Dyschromatopsia in Relation to Stages of Choked Disk," *Jour. Am. Med. Assn.*, 1911, lvii., 200–208.

[2] These will be made the subject of the fourth paper in this sequence.

ciated with primary optic atrophy, has led to some alteration in the percentage figures for the entire series.

However, it was pointed out in relation to the first series of 200 that in 12 of the 42 cases showing hemianopic defects there was a tendency toward binasal blindness, consequent in all cases upon advanced secondary atrophy. In the more recent series of 100 there have been five additional examples of this variety of field distortion. It is with the perimetric deviations of this type that the present communication will deal.[1]

In our second paper the attempt was made to correlate with the advancing stages of choked disk the distortions of the fields of vision which may occur with each of the convenient clinical subdivisions suggested by Marcus Gunn. It was pointed out that in Gunn's fifth stage of the process—the stage of secondary atrophy with recession of the measurable swelling, brought about by the contraction of new-tissue formation—he expressed the opinion that blindness was inevitable. This is the stage in which acuity is reduced to the mere counting of fingers and in which there are frequent periods of temporary amaurosis. From the standpoint of perimetry, we stated that in this stage:

> "There is apt to be achromatopsia in one or both eyes, though small form fields (often requiring discs larger than 0.5*cm*) may be plotted. These often show a tendency toward a binasal hemianopsia, with loss of central vision. Some vision may be preserved by operation."

Two examples were given (Cases XI and XII) in which the process of constriction in the narrowing fields was shown to affect the nasal more extensively than the temporal field and the color peripheries more than those for form. In other

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[1] There seems to be considerable confusion on the part of some recorders as to what the terms "nasal" and "temporal" refer to in speaking of hemianopsia. They, of course, imply *the nasal or temporal field of vision*, not *the nasal or temporal half of the retina*. Thus C. A. Wood's confusing report of a case ("Probable Tumor of Pituitary Body without Gigantism but Exhibiting a Binasal Hemianopsia," *Ophth. Rec.*, 1908, xvii., 109) of so-called binasal hemianopsia seems from the charts to be unquestionably one of bitemporal hemianopsia, as the terms are commonly used.

words, as the secondary atrophy progressed toward ultimate blindness the fibres which resisted the advancing process for the longest time originated from a small area in the nasal retina adjacent to the macula.

When the progress of the choked disk has been unequal in the two eyes, naturally the condition described above may be limited to one eye alone. It is therefore only when the constriction has advanced with bilaterally equal steps that binasal blindness will be found, with preservation of a small, more or less symmetrical, paracentral area of vision in each temporal field.

In the following cases it was possible by consecutive perimetric examinations to observe the progressive changes leading up to the condition under discussion. The degree of neuro-retinal involvement was unequal in the two eyes. The process, however, even for the eye least seriously implicated, as estimated by perimetry, had advanced beyond the stage at which the matter was dropped in our second paper.

CASE I.—Surgical No. 29088. *Large dural endothelioma of left hemisphere. High grade of choked disk, declining after successful enucleation of tumor. Progressive tendency toward nasal hemianopsia. Ultimate loss of vision on side of lesion.*

January 14, 1912.—A. M., aged 29 years. Tumor symptoms of eight months' duration. Typical history of large growth of left hemisphere, with profound general pressure symptoms: advancing paralysis of right arm and leg.

Examination of eyes.—Pupils dilated; right larger than left. Reactions normal. No oculomotor palsies. The fundi show an advanced grade (Gunn's fifth stage) of choked disk, with œdema extending over retinæ. Swelling measures 6 D. on the right, and 5½ D. on the left, where the process is apparently more advanced. Numerous punctate hemorrhages; extensive new-tissue formation; marked engorgement and tortuosity of veins, which in places crop out of the œdema; arteries narrow.

Fields, taken with bedside perimetry, are somewhat unsatisfactory, owing to the patient's condition. They show some slight concentric constriction without interlacing[1] (Fig. 1).

[1] It may be noted here that the elicitation of color interlacing, on which emphasis was laid in the earlier papers with Bordley and Heuer, is doubtless a matter largely of personal equation on the part of the examiner. Though the observations have been corroborated by some, others have failed to

V.O.S. $\frac{20}{40}$; V.O.D. $\frac{20}{40}$, but no subjective lowering of acuity.

January 17.—First operation. Right subtemporal decompression—purely a temporizing measure. There was an immediate post-operative subsidence in the swelling—on the evening of *January 17*, to 4 D. left and 3 D. right; and on *January 19* to 3 D. left and $2\frac{1}{2}$ D. right.

All of the general pressure symptoms were much ameliorated during the succeeding four weeks. There were no fresh retinal hemorrhages; the old ones became absorbed. However, by *February 12*, the condition of the eyes was about stationary, with a persistent swelling measuring 2 D. The pallor of secondary atrophy was apparent. On the

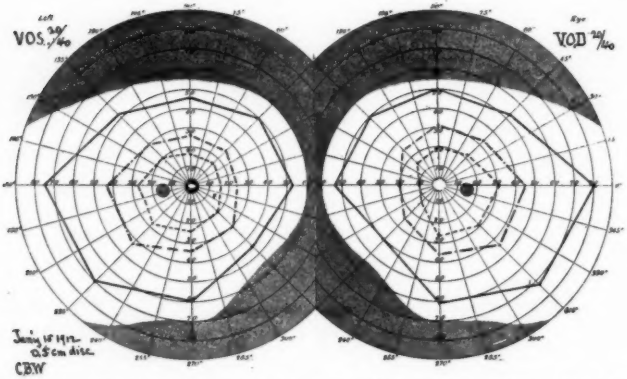

FIG. 1. Case I. Charts of January 15th before operation. Showing beginning constriction.

left the outlines of the disk could be made out, but on the right they were still obscured, with vascular embedding and tortuosity still notable. Subjective lowering of acuity on the left. The *fields* showed marked constriction when compared with those taken on admission.

February 15.—Second operation. First stage exploration for tumor.—Left osteoplastic flap; great loss of blood. Ten days elapsed before the hemoglobin percentage reached its former level.

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observe interlacing. Dr. Walker, for example, has observed this condition far less often than did his predecessors. He has perhaps been more careful not to fatigue the retina with a previous ophthalmoscopic examination, and has devised a carrier for the color discs, in the use of which the patient is unable to tell by any movement on the part of the examiner when the shift is made from one color to another.—*H. C.*

February 28.—Third operation. Second stage exploration with opening of dura and exposure of a large endothelioma adherent to the longitudinal sinus. Again a marked loss of blood. After an interval of a week the hemoglobin had again returned to normal.

April 6.—Fourth operation.—The large endothelioma, weighing 170 grams, was safely enucleated from the left hemisphere.

During the interval between these operations there was a gradual subsidence of the choked disk, so that on the morning of *April 6*, the day of the final operation, the swelling measured 2 D. on the right and 1 D. on the left. An

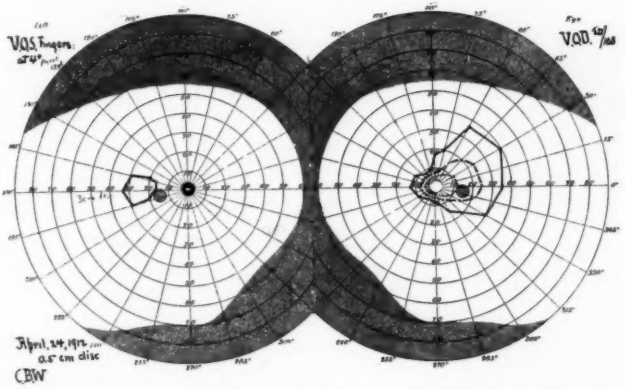

FIG. 2. Case I. Condition on April 24th: choked disk subsiding after removal of tumor from left hemisphere; secondary atrophy more pronounced in left eye.

increasing pallor of each disk from the secondary scar formation was apparent.

On *April 8* the swelling on the right was 0.5 D.; on the left there was no elevation whatsoever. In both eyes there was marked perivascular striation with pallor of secondary atrophy. Veins and arteries narrow though tortuous.

It became obvious that vision was rapidly receding in the left eye, but owing to a temporary post-operative aphasia no *fields* were taken until *April 24* (Fig. 2). They show on the left, the typical paracentral patch of vision for form without color perception; on the right—the eye contralateral to the lesion and in which the process was less advanced—a practical loss of nasal vision with some preservation

of the paracentral field for both form and colors on the temporal side. Disks pale and glistening, with characteristic changes of secondary atrophy, more marked in the left eye. V.O.S. fingers at 4 inches; V.O.D. $\frac{20}{100}$.

May 6.—Some slight further constriction observable in the nasal field of the right eye, and on the left merely a temporal patch, where the flash of a 2.8 volt lamp is appreciable (Fig. 3). No change in the appearance of the fundi. No determinable hemianopic pupillary reaction. V.O.S. practically *nil;* V.O.D. $\frac{20}{100}$.

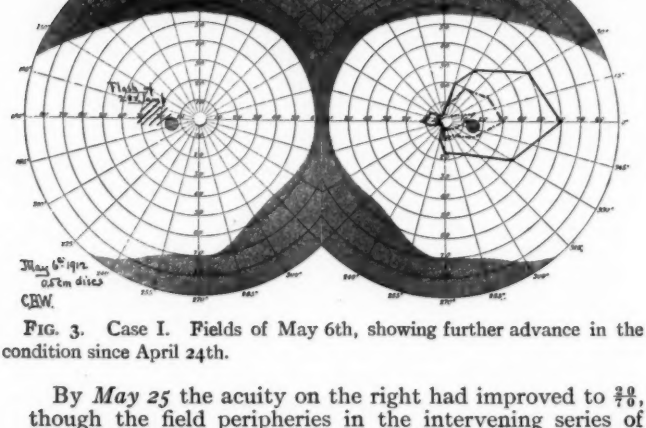

FIG. 3. Case I. Fields of May 6th, showing further advance in the condition since April 24th.

By *May 25* the acuity on the right had improved to $\frac{20}{70}$, though the field peripheries in the intervening series of charts show some progressive nasal constriction up to this time (Fig. 4).

On *May 28*, V.O.D. $\frac{20}{40}$, and on *June 7*, V.O.D. $\frac{20}{40}$. The color and form peripheries remained practically unaltered after *May 25*. Discharged.

In the above illustration, therefore, the process on the left had advanced beyond the stage at which a small temporal field for vision may be preserved. On the right it had not quite reached the point of complete blotting out either of colors or of all nasal vision. And at this stage it is quite common to see projecting from the preserved temporal field a tongue of vision which juts across the fixation point onto the otherwise blind nasal field (*cf.* Fig. 5).

If the process had been slightly more advanced on the right and less advanced on the left, the field would have shown the characteristic binasal blindness to which we refer.

In view of the well-recognized fact that in the case of tumors

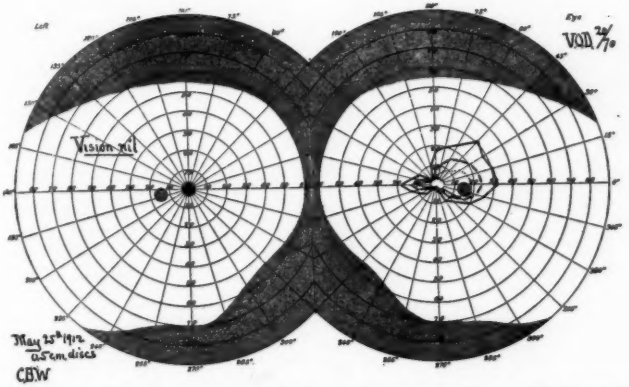

FIG. 4. Case I. Showing ultimate stationary condition, with left blindness, and preservation of paracentral vision on right confined practically to temporal half of field.

of the cerebral hemispheres the secondary neuro-retinal lesion is apt to be more advanced in the homolateral eye, as in the case just cited, it may be surmised that a bilaterally symmetrical condition, as shown by ophthalmoscope and perimeter, would be more likely to indicate a distant growth. As a matter of fact most of the examples of what we have ventured to designate as a binasal hemianopsia have occurred in association with subtentorial tumors; for growths in this situation, through the intermediation of the almost inevitable hydrops of the ventricles, lead not only to an abrupt advance of the choked disk but to a process which is fairly symmetrical in the two eyes, owing to the equalization of tension in both cerebral hemispheres.

However, there may be exceptions to this rule, for even with a subtentorial lesion the neuro-retinal change may be very much more advanced in one eye than in the other, as the following two cases illustrate. In the first there was an extra-

cerebellar tumor in the right lateral recess; in the second an intracerebellar growth in the right hemisphere.

CASE II.—Surgical No. 28640. *Right cerebello-pontine endothelioma. Internal hydrocephalus; advanced grade of choked disk; homolateral tendency toward nasal hemianopsia.*

June 12, 1906.—H. S., aged 43 years. Typical history of cerebello-pontine lesion with pressure symptoms of three years' duration.

Examination of eyes.—Slight diplopia from weakness of right abducens. Right pupil slightly larger than left and relatively inactive to light. No reaction to accommodation

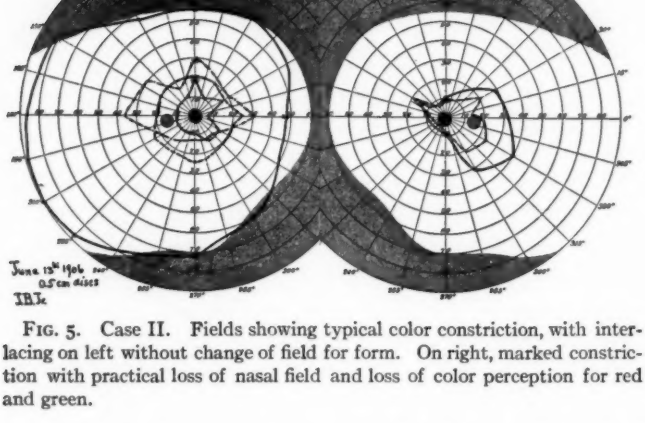

FIG. 5. Case II. Fields showing typical color constriction, with interlacing on left without change of field for form. On right, marked constriction with practical loss of nasal field and loss of color perception for red and green.

in right eye; consensual reaction active left to right, inactive or absent right to left. The fundi show a bilateral receding choked disk, more advanced in the right than in the left eye. No exudates nor hemorrhages, but the disks are completely obscured, the vessels small, the nerves atrophic. There is an increase of pigment and much new tissue. Swelling: left 4 D.; right 1½ D.

The *fields* (Fig. 5) show a normal form periphery on the left but with color interlacing; on the right, the typical constriction with merely a tongue of vision remaining in the nasal field (*cf.* Fig. 4 of Case I.). Acuity not tested.

The patient died from pneumonia three days after a primary suboccipital decompression. The *autopsy* showed

a large, right-sided cerebello-pontine endothelioma, with secondary hydrocephalus and local (chiasmal) conditions similar to those pictured in Fig. 11. Histologically no difference whatsoever can be made out in the appearance of the two nerves. Both contain some scattered fibres which stain as normal. They are not confined on the right to the presumed (Henschen) position of the macular bundle.

CASE III.—Surgical No. 27884. *Large glioma of right cerebellar hemisphere. Choked disk of high grade with constriction of field in stage of nasal hemianopsia on side of lesion.*

May 27, 1911.—Blaine T., aged 26 years. Trauma four months before entrance, followed by a typical tumor syn-

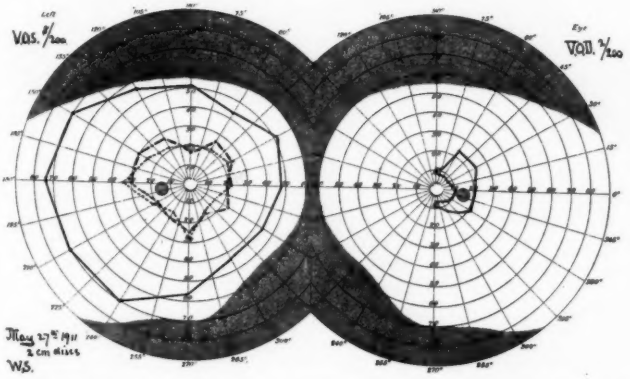

FIG. 6. Case III. Fields of May 27th (*2cm* test object) on admission; right cerebellar tumor.

drome of rapid onset. Characteristic localizing signs of right cerebellar lesion, with coincident extracerebellar involvement (acusticus, etc.). Profound general pressure manifestations: gradual loss of vision, particularly on right; periods of amaurosis.

Examination of eyes.—Nystagmus marked; coarse movements to right. *Pupils* regular, dilated, equal; reactions sluggish. Double exophthalmos, possibly greater on right. Palpebral venules more dilated on right. Convergence poor. Slight weakness of right external rectus. *Fundi:* disks measure about 5 D. with a slightly less aggravated picture of typical high grade choked disk on the left. Disk margins obliterated. Engorged tortuous veins dip in and

out of œdema. Arteries narrow. Numerous exudates and hemorrhages.

Fields (Fig. 6) show slight constriction with color interlacing on left; on right the characteristic small temporal patch with loss of central vision. V.O.S. $\frac{8}{200}$; V.O.D. $\frac{3}{200}$.

June 1, 1911.—Operation.—Suboccipital exploration. Exposure of large inoperable tumor of left hemisphere. Ventricular puncture disclosing hydrocephalus.

Condition greatly improved in all respects by operation except for vision, in which there was a progressive subjective lowering.

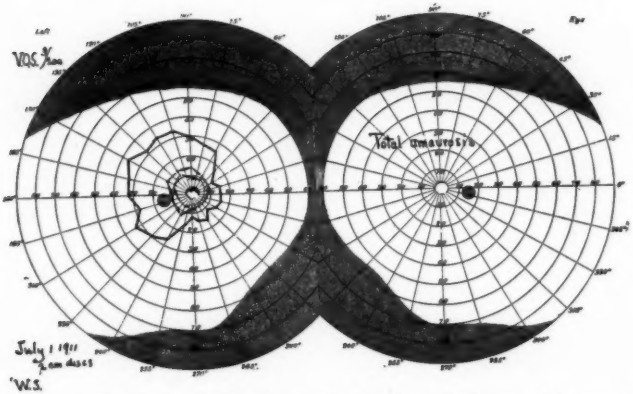

FIG. 7. Case III. Fields (*2cm* test object) on discharge: right amaurosis; left, tendency to greater nasal than temporal constriction.

July 1, 1911.—Choked disk, left, subsided to 3 D.; right 2 D. Marked pallor; margins indistinctly apparent; typical changes of secondary atrophy. *Fields* (Fig. 7): Complete blindness on right; on left (*2cm* test object) a marked constriction, especially of nasal fields. Vision O.S. $\frac{3}{200}$; O.D. *nil*. Patient discharged.

The foregoing two examples go to show that, as is so often true of cerebral tumors, so even with ones situated below the tentorium the neuro-retinal change may be far more advanced on the side of the lesion. Still, this is not inevitable, for we have seen examples of cerebral as well as cerebellar tumors with the choked disk and associated perimetric deviations much more advanced in the contralateral eye.

However, when a subtentorial growth, whether it has an intra- or extracerebellar position, has produced hydrocephalus the neuro-retinal change is prone to advance with approximately equal steps in the two eyes; and it is in this group of cases, after secondary atrophy has occurred, that one is particularly apt to encounter instances of fairly symmetrical binasal hemianopsia with bilateral preservation of some temporal vision for form.

The following case will serve as an example of a fairly symmetrical change, the slight disparity between the two eyes being in favor of the eye on the side of the lesion.

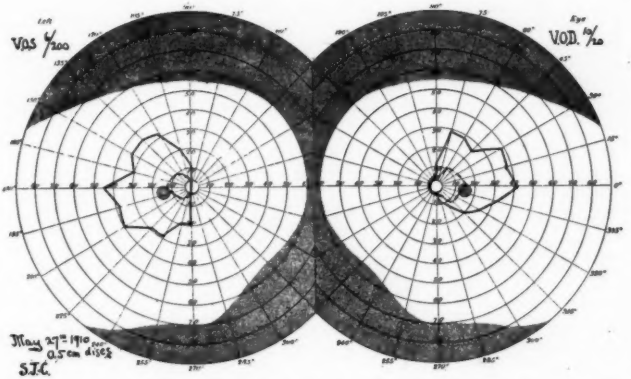

FIG. 8. Case IV. Fields of May 27th with tendency to binasal hemianopsia; macula still preserved on right. Before operation.

CASE IV.—Surgical No. 26606. *Right cerebello-pontine tumor. Choked disk in stage of advanced secondary atrophy: tendency to binasal hemianopsia.*

May 26, 1910.—Mrs. N. S., aged 43 years. Symptoms for two years with severe headache, vomiting, vertigo, static ataxia, deafness in the right ear with tinnitus, numbness of the right side of the face, and absence of the corneal reflex on the right.

Failing vision for a year, with recurring attacks of temporary amaurosis; also fluctuating periods of diplopia.

Ophthalmological examination.—Pupils equal with normal reactions to light and accommodation. Bilateral (fluctuat-

ing) weakness of both abducentes.[1] *Choked disk* of high grade; process more advanced on left, where the swelling is only 3 D.; pallor of secondary atrophy; abundance of new tissue. Swelling on right 5 D. No exudates nor hemorrhages. V.O.S. $\frac{6}{200}$; V.O.D. $\frac{15}{20}$.

Fields of *May 27* show (Fig. 8) marked constriction, the seeing areas being confined solely to the temporal sides. Achromatopsia almost complete. Wernicke tests:—Prompt pupillary reactions can be obtained from a ray of light thrown upon either side of both retinæ, though the reactions are more active from the nasal than from the temporal

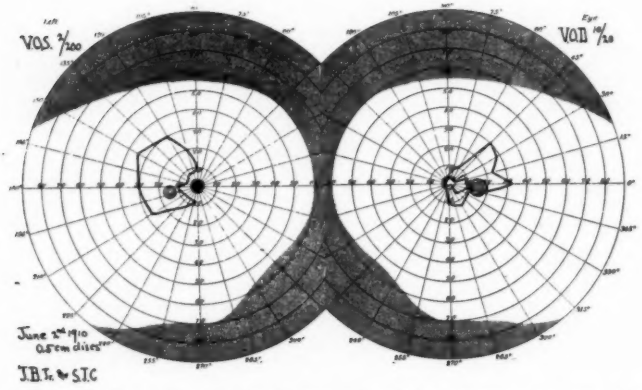

FIG. 9. Case IV. Fields of June 2d, showing advance in course of a week. Left achromatopsia with loss of macular vision.

halves of the retinæ. It is impossible to determine accurately the prism reaction, owing to difficulty of fixation. (Patient examined by Dr. Saenger of Hamburg.)

By *June 2* a further shrinkage in the fields had occurred (Fig. 9), with complete loss of macular vision on the left. V.O.S. $\frac{2}{200}$; V.O.D. $\frac{20}{40}$.

June 4.—Operation. Suboccipital exploration.—Marked tension. Tumor inaccessible. Decompression.

June 14.—Considerable subjective improvement in vision. *Fields* (Fig. 10) show return of central vision in left eye with recognition for colors (red and blue) in both eyes. Height of both disks 3 D. V.O.S. $\frac{8}{200}$; V.O.D. $\frac{15}{20}$.

[1] An explanation of this false localizing sign has been advanced by one of us (Cushing) on the basis of vascular strangulation of the Nervi abducentes. *Brain*, 1910, xxxiii, 204–235.

June 22.—Ophthalmological condition stationary. *Fields* of *June 14, 19,* and *22* practically alike. Discharged.

Subsequent history.—The patient passed into other hands, and owing to the return of headaches and on the presumption that there was a cerebral tumor, an osteoplastic operation over the right hemisphere was performed at her home. Owing to the internal hydrocephalus an extreme herniation of the unprotected brain resulted. In *April, 1911,* she again came under our care.

Condition of eyes.—Practically complete amaurosis; for six months has been barely able to distinguish light.

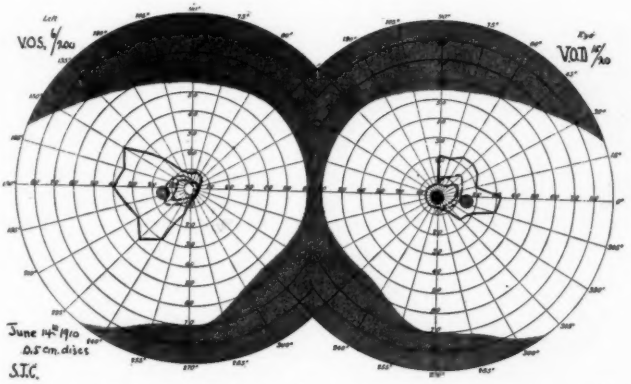

FIG. 10. Case IV. Fields of June 14th, ten days after operation. Return, in left, of central vision and of color perception; tendency to binasal hemianopsia persists.

Increased weakness of abducentes. Coarse nystagmus (not present on first admission). The fundi show a glistening nerve-head in an advanced stage of secondary atrophy and with a multitude of punctate hemorrhages; no measurable swelling. Impossible to take fields.

A cerebrospinal fluid leak occurred at the margin of the insecurely closed wound covering the herniated cerebrum. The patient died from a consequent meningitis on *April 30.*

Post-mortem examination.—A large right cerebellopontine endothelioma; internal hydrocephalus; meningitis. The ante-mortem free escape of the cerebrospinal fluid had apparently allowed the formerly distended third ventricle to collapse, but it was apparent from the grooves in the outer aspect of the optic nerves made by the adjacent

carotids (Fig 11), that the distended ventricle must have pushed the nerves against these vessels.

Histological examination of the optic nerves shows extreme secondary atrophy. A few scattered normal fibres are seen.

The post-mortem findings in this and other cases indicate, as will be pointed out later, what may possibly be a mechanical influence at work in causing an especial damage to the externally placed, uncrossed fasciculi in addition to that which the nerve suffers as a whole owing to the secondary scar formation.

The case reports of the following six examples may be given in less detail. Some of the patients were observed early in the series, and in outlining the field peripheries not as many points as might be desired were taken. However, it was from these early observations that our attention was first called to the tendency toward ultimate binasal blindness to which we refer—a tendency, in other words, for the narrowing peripheries, during the progress of a secondary atrophy, to become limited to a small bitemporal field surrounding each blind spot.

CASE V.—Surgical No. 10417. *Stationary tendency to binasal hemianopsia eleven years after a permanently successful decompression for cerebellar tumor (tuberculoma?).*

May 24, 1900.—A. N., colored, 10 years of age. Characteristic cerebellar symptoms for ten months following trauma. Progressive failure of vision for seven months.

Examination of eyes.—Nystagmus; slight exophthalmos. *Pupils* wide but still react to light. *Acuity* reduced to counting fingers. A high grade of "optic neuritis" reported by the examiner. No fields taken.

On *June 8, 1900*, a bilateral cerebellar *decompression operation* was performed, with prompt relief of pressure symptoms. The patient was discharged and was lost sight of until:

May 7, 1911, when he re-entered the medical ward of the hospital owing to a fever, which proved to be measles. He has had no return of the former pressure symptoms, though there remain some slight evidences of cerebellar involvement.

The vision (subjectively) has been stationary at present level since a short time after the operation eleven years ago. Fundi show the typical changes of secondary atrophy, with obliterated physiological cups, pallor of the disks and perivascular streaking; no œdema. V.O.S.$\frac{1}{200}$; V.O.D.$\frac{3}{200}$.

TO ILLUSTRATE DRS. CUSHING AND WALKER'S ARTICLE ON "DISTORTIONS OF THE VISUAL FIELDS IN CASES OF BRAIN TUMOR."

FIG. 11. Case IV. Base of brain, showing "tumor" of right lateral recess; lacerations of temporal lobes owing to arachnoidal herniations (Wolbach) through dura; stumps of carotid arteries (*C*) symmetrically indenting the outer side of each optic nerve.

The *fields* (*2cm* discs) show a constriction of characteristic form with almost complete nasal blindness and achromatopsia (Fig. 12).

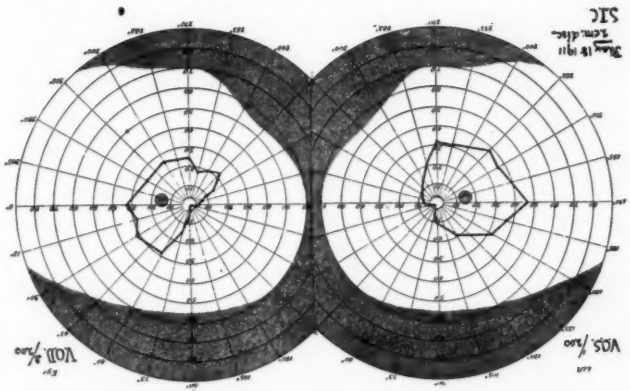

FIG. 12. Case V. Fields (*2cm* discs) eleven years after subsidence of choked disk with secondary atrophy. No color perception.

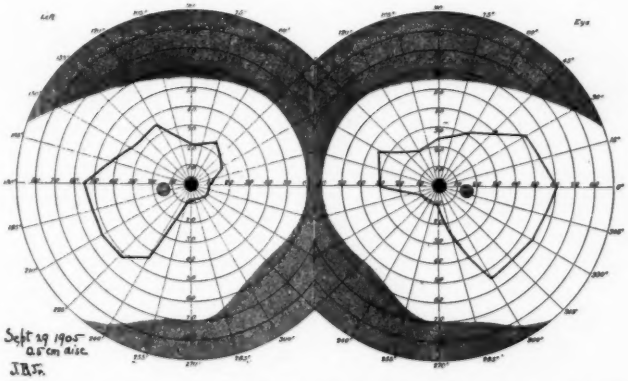

FIG. 13. Case VI. Fields showing the characteristic tendency (stationary) toward binasal defect, with achromatopsia, following bilateral choked disk from cerebellar tumor.

CASE VI.—Surgical No. 17895. *Tendency to binasal hemianopsia in a case of left intracerebellar glioma with low-grade internal hydrocephalus. Suboccipital decompression. Subsequent removal of tumor.*

June 18, 1905.—Lucius H., aged 13 years. Symptoms for four years, becoming typical of an intracerebellar lesion. Long course of antiluetic treatment, with temporary subjective improvement.

Eyes.—Recurrent attacks of diplopia and temporary amaurosis; a high grade of choked disk with hemorrhages and exudates; a stellate figure in the macular region typical of so-called albuminuric retinitis; much formation of new tissue. Swelling of right disk 6 D., of left 6½ D. Acuity not tested; very low. *Fields* of *June 20* (Bordley) show normal outline for form.

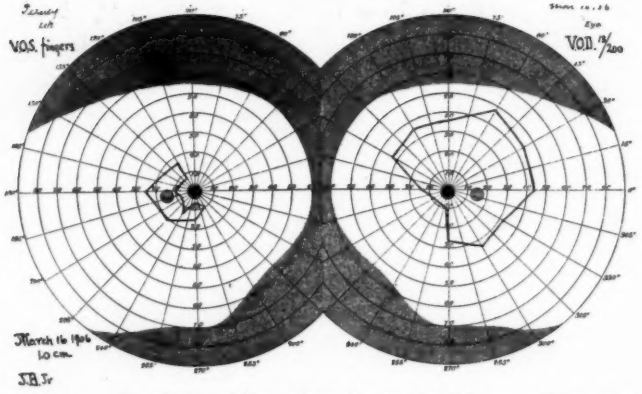

FIG. 14. Case VII. Fields of declining choked disk, more advanced in eye homolateral to tumor of left cerebrum.

June 26.—Operation.—Suboccipital decompression; no tumor disclosed. There was a slow subsidence of the neuro-retinal swelling, which did not entirely disappear for three or four months. With the declining choked disk color perception was lost and the form fields became more and more constricted—particularly the nasal halves—until September, when the process became stationary (Fig. 13).

During the succeeding six months twelve consecutive observations showed practically no further change in the fields. Two years later an encapsulated glioma was successfully removed from the left cerebellar lobe by a surgeon in another city.

CASE VII.—Surgical No. 18850½. *Cerebral tumor, with choked disk more advanced in homolateral eye. Binasal field constriction.*

March 16, 1906.—Mr. S., 34 years of age. Symptoms of tumor (left hemisphere) of nine months' duration. Pressure symptoms profound. Recent rapid loss of vision.

Examination of eyes.—High grade of choked disk with abundant new tissue formation; a few small hemorrhages. Swelling, left (declining?) 5 D.; right 7 D. V.O.S. fingers; V.O.D. $\frac{3}{200}$. *Fields* (Bordley) show characteristic constriction away from nasal fields, the boundaries centring about blind spot (Fig. 14). No color perception.

March 20, 1906.—Operation. Left subtemporal decompression.—Only partial subsidence of choked disk at the

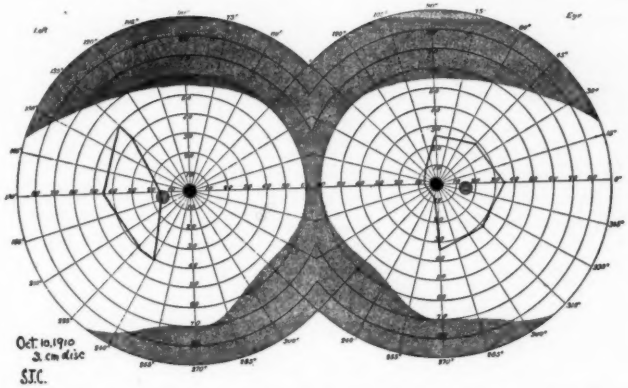

FIG. 15. Case VIII. Fields before operation, taken with 3*cm* discs. Total achromatopsia.

time of discharge, on *April 10.* No further perimetric observations made.

CASE VIII.—Surgical No. 26696. *Pontine glioma with secondary choked disk in atrophic stage. Binasal blindness. Autopsy.*

October 6, 1910.—Harold S., aged 9 years. General pressure symptoms for eight months. Enlargement of head. Suggestive cerebellar syndrome; ataxia, falling backward, tilting of head, etc. Patient is fat; has gained fourteen pounds in weight. (Secondary hypophysial symptoms?)

Eyes.—Impairment of vision noted early in the disease. Condition diagnosed as "albuminuric retinitis" and patient treated for "Bright's disease" for several months. Frequent periods of total amaurosis.

Ophthalmological examination shows a marked dilatation of venules of lids; slight exophthalmos. *Pupils* widely dilated; without reactions. *Acuity* practically *nil;* cannot count fingers. Ocular movements normal; no nystagmus. *Fundi:* Declining choked disk with secondary atrophy; height 4 D. Much new tissue. No hemorrhages nor exudates. Vessels tortuous but small and buried in the œdema. *Fields* show (Fig. 15) a patch of preserved vision to large (3*cm*) discs in each temporal field. No colors recognized even in large sheets.

October 10.—Operation.—Suboccipital exploration dis-

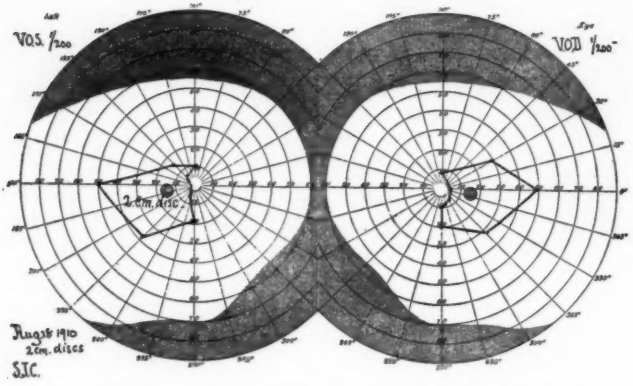

FIG. 18. Case IX. Fields on admission, with 2*cm* discs.

closed great tension. A subsequent cerebrospinal fluid escape from the mid-incision. Cultures negative. Continued escape of fluid. Death occurred *October 28.*

Autopsy.—Brain removed after fixation *in situ.* Internal hydrocephalus with greatly dilated third ventricle, flattened hypophysis, and distorted chiasm. Enlargement of pineal gland. Diffuse pontine glioma with closure of iter (Figs. 16 and 17).

CASE IX.—Surgical No. 26459. *Unlocalizable (temporal lobe?) tumor. High grade of choked disk in atrophic stage. Marked constriction with binasal blindness.*

August 27, 1910.—Luke H., aged 31 years. Pressure symptoms for three years; severe of late, with progressive failure of vision for past two months. No localizing symptoms, though there are attacks with loss of taste and smell, suggesting involvement of the uncus.

To Illustrate Drs. Cushing and Walker's Article on "Distortions of the Visual Fields in Cases of Brain Tumor."

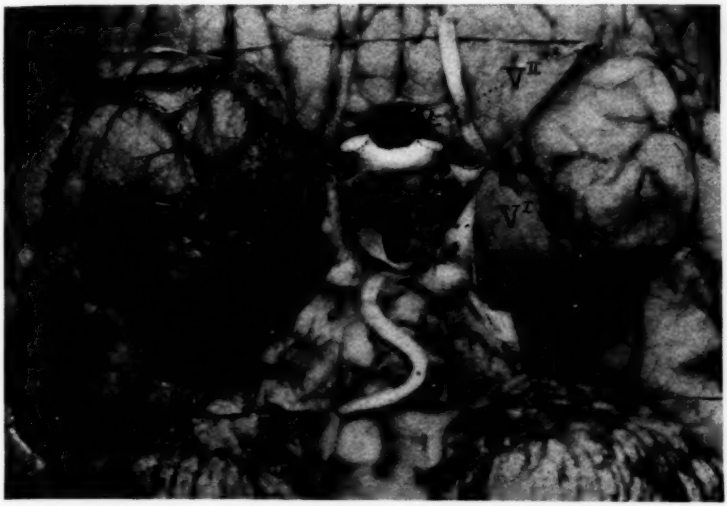

Fig. 16. Case VIII. Showing (V^{I}) thinned and widened third ventricle (ruptured on removal and here collapsed). This when distended depressed the chiasm, owing to extension forward to point (V^{II}) between the hemispheres anterior to chiasm. Note position of carotids and communicating vessels.

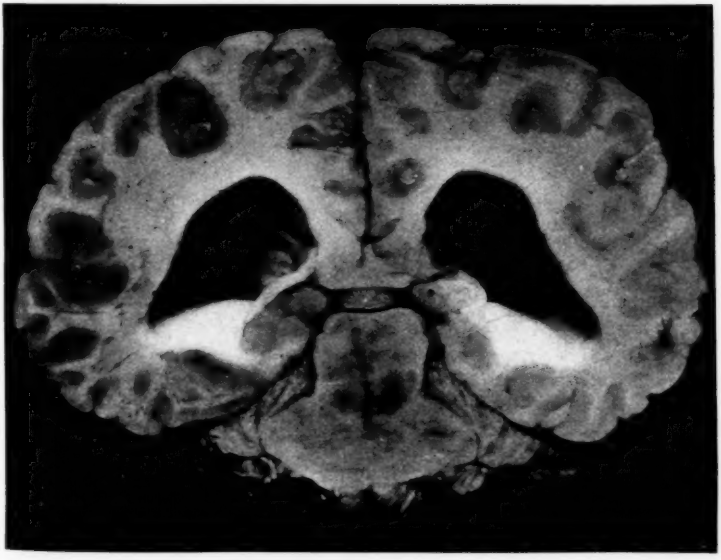

Fig. 17. Case VIII. Coronal section through pons and pineal gland to show degree of hydrocephalus.

Eyes.—He has had frequent amaurotic periods. No nystagmus; no diplopia. *Pupils* wide but unequal; right larger than left. Sluggish light reaction. Can barely count fingers. Fundi show choked disk of 8 to 9 D. with fresh hemorrhages and exudates; œdema spreads far over retinæ; macular figures present. Acuity not measurable —less than $\frac{1}{200}$. Perimetry with *2cm* discs gives a small constricted bitemporal field of vision. No color perception (Fig. 18).

August 28.—Operation.—Right subtemporal decompression (Crowe) disclosing marked cerebral tension. There

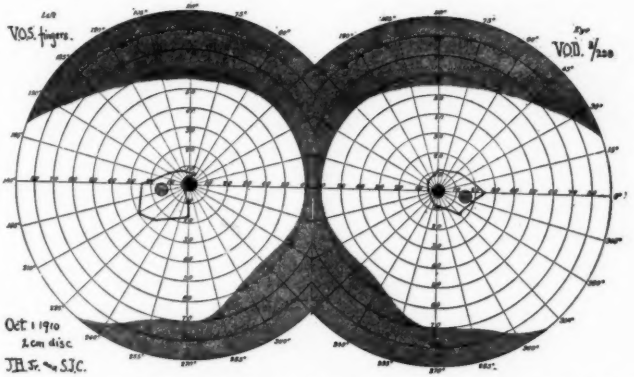

FIG. 19. Case IX. Fields of October 1st, in stationary post-operative stage, after complete subsidence of choked disk.

was a very slow subsidence of the choked disk after the operation, though there was otherwise prompt improvement in the patient's condition.

A glistening and atrophic nerve-head was disclosed as the swelling left the retina. A small bitemporal field of vision, with *2cm* test object, remains (*cf.* Fig. 19). Subjective improvement due doubtless to restoration of central vision on right. V. O.S. fingers; V.O.D. $\frac{1}{200}$.

Several subsequent *fields* taken during 1911 (Crowe or Bordley) with 1 or *2cm* test objects show practically the same condition.

On *January 20, 1912* (seventeen months after the operation), a very careful registration at every 15° with a rimless 0.5*cm* disc shows practically the same outlines as in Figure 19. The nerve-heads are flat and show the characteristic changes of secondary atrophy. All active pressure symptoms are for the time being in abeyance.

In the following case much more detailed studies were made. It goes to show, moreover, that even with a declining choked disk at the stage with which we are dealing, the prognosis for possible improvement in vision is not utterly hopeless. The reproduction of two from the series of many charts will suffice for illustration.

CASE X.—Surgical No. 23889. *Left intracerebellar tumor. Choked disk in stage of atrophy with nasal hemianopsia. Improvement in vision after removal of tumor.*

April 1, 1909.—Edward P., aged 26. Symptoms of

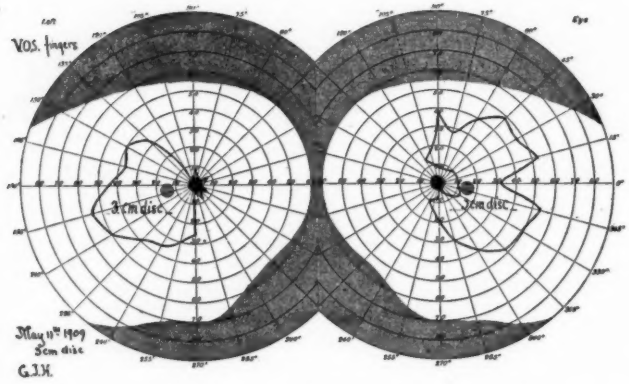

FIG. 20. Case X. Fields of May 11, 1909, with 3*cm* discs. (*Cf.* Fig. 21, giving fields of July 11, 1910, with 2*cm* discs.)

four years' duration, typical of left intracerebellar lesion. Internal hydrocephalus and progressive failure of vision, with practically total blindness on admission.

Examination of eyes.—Bilateral choked disk of 7 D. with œdema extending out over retinæ; advanced secondary atrophy. No colors recognized. A bright light thrown on each temporal retina barely appreciated. Pupillary reactions, however, are still obtainable from either eye. Negative Wernicke. Impossible to take fields owing to patient's dizziness and ataxia. He cannot count fingers.

April 4.—Operation.—Clean enucleation of encapsulated cystic glio-psammoma from left cerebellar hemisphere. Uninterrupted recovery.

May 11.—Bilateral subsidence of choked disk to 3 D., disclosing characteristic changes of secondary atrophy. Unlooked for subjective improvement in vision, particularly on left. *Fields* for form (Fig. 20), taken with large white (3*cm*) object, show binasal hemianopsia. No color perception even with large sheets. V.O.S. fingers; V.O.D. *nil*. Patient discharged.

June 18.—Reports for examination.—Fields taken with same 3*cm* test object show further widening of form boundaries, though tendency toward nasal constriction persists.

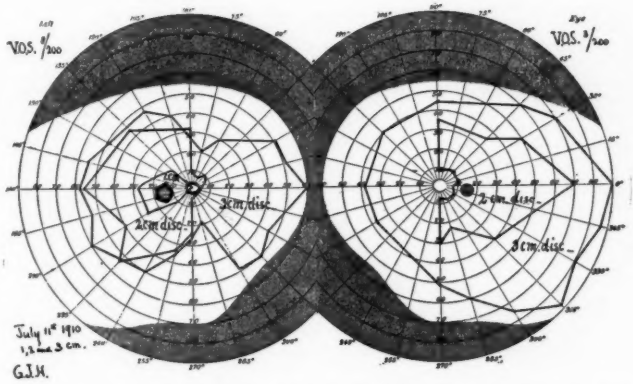

FIG. 21. Case X. Composite fields of July 11, 1910, taken with 3*cm*, 2*cm*, and 1*cm* discs; *cf.* the 2*cm* boundary in comparison with the 3*cm* boundary of the year before (Fig. 20).

January 11, 1910.—Reports.—Form *fields*, particularly the right, show, with white 3*cm* disc, a still further improvement. V.O.S. and V.O.D. about $\frac{9}{200}$.

July 11, 1910.— Reports. Perception of 3*cm* disc now fairly good in nasal areas. Vision in temporal fields much improved. Charts plotted with a 2*cm* disc bring out practically the same fields disclosed with a 3*cm* disc on *May 11, 1909*, after the operation (Fig. 21). No color recognition; a small area of form perception to a 1*cm* disc V.O.S. $\frac{8}{200}$; V.O.D. $\frac{3}{200}$.

June 3, 1912.—Reports (twenty months after operation). Well in all respects, except for lowered vision. Fields practically as in *July, 1911*, though it is now possible to plot a small area with a 0.5*cm* disc in the paracentral temporal field of both eyes.

In the following case the constriction had likewise advanced to an extreme degree. The patient from the first has been an excellent subject for perimetry, attentive and untiring; and many detailed charts have been made, with points taken at every fifteen degrees. The small 0.5*cm* rimless discs were used throughout in making the tests. Doubtless had larger (2 or 3*cm*) test objects been used, fields such as those given for some of the preceding cases (*e. g.*, Case IX) might have been plotted. However, the demonstration is more convincing with these small test objects.[1] Four only of the series of charts will be reproduced with the history.

CASE XI.—Surgical No. 29501. *Subtentorial tumor (uncertified). Internal hydrocephalus. Advanced grade of secondary optic atrophy with tendency to complete binasal blindness.*

March 25, 1912.—H. A. E., aged 34 years. Typical history of advancing tumor symptoms with usual general pressure phenomena, of two years' duration. No definite localizing symptoms. Presumably a subtentorial lesion.

Ophthalmological record.—The first subjective eye symptoms were noted about a year before admission to the hospital. At that time the patient would occasionally see floating opacities and flashes of light. Vision has progressively failed. No history of diplopia or temporary amaurosis.

Examination of eyes.—No oculomotor palsies. *Pupils* are equal and react promptly to light, accommodation, and consensually. Wilbrand test negative (*i. e.*, no noticeable movement of the eyes on throwing a beam of light on the blind retina). The Wernicke test (made with electrical perimeter lights after the manner of Hesse, with a modified Krusius pupillometer, as the entopic method of Hess could not be used by the patient) gives no pupillary change when a light is rotated on the perimeter from the blind to the seeing retina; and again when two lights are flashed alternately without interval, equidistant from the centre, there is no better reaction of the pupil from the seeing than from the blind retina until within 10° to 15° of the centre, when the seeing side gives a sharper reaction.

V.O.S. $\frac{3}{200}$; V.O.D. $\frac{3}{200}$. No color perception.

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[1] In this connection a valuable article by Rönne concerning the significance of the peripheral visual acuity for the prognosis of optic atrophy may be consulted. (*Klin. Monatsbl. f. Augenh.*, 1911, p. 154.)

The ophthalmoscope shows an advanced condition of receding choked disk, alike in the two eyes with a swelling of about 5 D. Extreme pallor of secondary atrophy with abundance of new tissue filling optic cup. Veins engorged, tortuous, and more or less imbedded. Arteries slightly contracted and tortuous. Macular region normal; peripheral chorioid and retina normal. No hemorrhages nor exudates.

Fields with 0.5*cm* discs, though difficult to plot owing to the uncertainty of fixation, show the characteristic bitemporal area of retained vision about the blind spot.

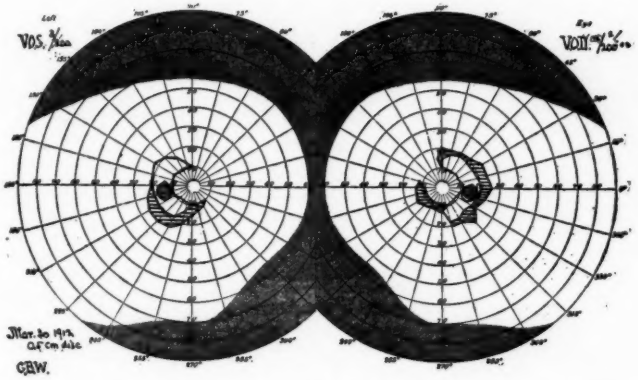

FIG. 22. Case XI. Fields of March 30th, five days after callosal puncture; typical of the last stage of advanced secondary atrophy. No color perception. White appears gray in shaded areas.

March 25.—Operation I.—Right ventricular puncture disclosing ventricular hydrops. Subsequent callosal puncture (*Balkenstich*) to right of falx. Marked subjective post-operative improvement.

March 30.—Five days after operation. Subsidence of measurable swelling to 3 D. Venous congestion somewhat diminished. *Fields* at this time, plotted in somewhat greater detail than those on admission, give practically the same outlines (Fig. 22).

April 4.—Ten days after operation. Vision subjectively improving. On the right, disk measures 2 D. and shows increasing pallor; traces of perivascular striation now appreciable near the disk. On the left, disk measures 2½ D., with same appearance as on right. *Fields* (Fig. 23) taken

at this time show a slight return of central vision. V.O.S. $\frac{4}{200}$; V.O.D. $\frac{3}{200}$.

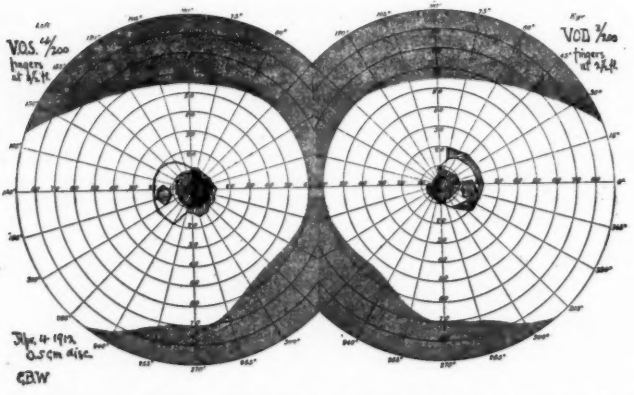

FIG. 23. Case XI. Fields of April 4th, with 0.5*cm* disc ten days after operation, showing slight return of central vision.

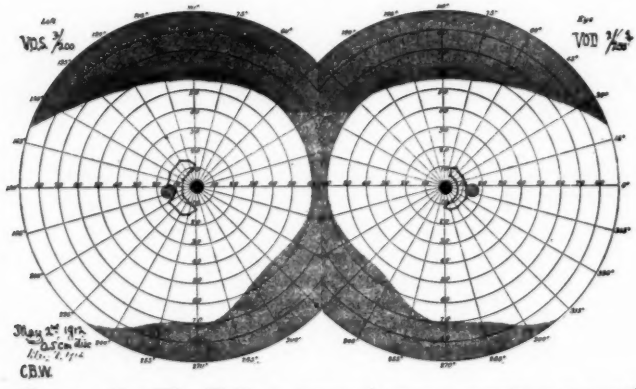

FIG. 24. Case XI. Fields on return of pressure symptoms at second admission.

Patient discharged *April 5*, "improved."

Readmission.—May 2, 1912.—Vision began to fail again soon after discharge, coincident with a return of headaches and dizziness.

The right disk again measures 5 D., with margins barely

distinguishable. Veins engorged and tortuous, and arteries small. The left disk measures 3½ D.; it is less hazy than right, and a trace of temporal margin can be made out. Veins less engorged and tortuous than on right.

Fields (Fig. 24) show a more marked constriction than on first admission. V.O.S.$\frac{3}{200}$; V.O.D.$\frac{3}{200}$.

May 9, 1912—Operation II.—Second callosal puncture (*Balkenstich*); this time to the left of falx Again marked subjective post-operative improvement.

May 17.—On the *right*, acuity has improved to $\frac{4}{200}$. Disk has receded to 3 D. and temporal margin is apparent.

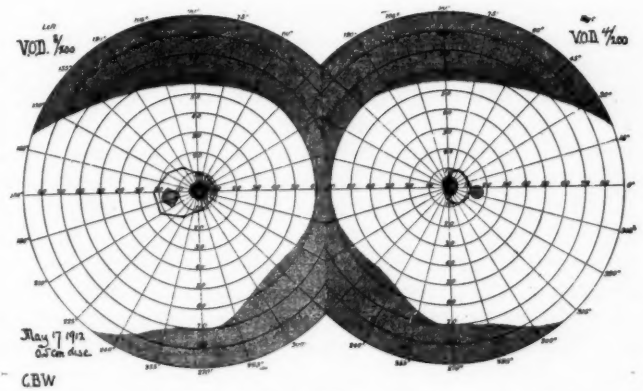

FIG. 25. Case XI. Fields of May 17th, eight days after second callosal puncture.

Extreme pallor. Veins still full and tortuous, but arteries now fairly well filled. Slight perivascular striation near disk.

On the *left*, acuity has improved to $\frac{8}{200}$. Disk measures 3 D.; nasal margins more distinct and temporal margins fairly clear. Traces of perivascular striation. Arteries fairly well filled, with slight tendency to tortuosity.

Fields (Fig. 25) show some return of macular vision on the left and faint central vision on the right.

Patient discharged *May 17*, considerably improved by the second puncture, but the prognosis for vision seemed less good than at the time of first discharge on *April 5*, in spite of the increased acuity.

Reports by letter, *August, 1912*, ocular condition about stationary. No subiective return of pressure symptoms.

BINASAL HEMIANOPSIA IN GENERAL.

It may appear somewhat imaginative to designate the field defects which accompany the foregoing case reports as examples of hemianopsia, for they admittedly fail to show the clean-cut vertical meridians dividing the blind from the seeing retina which often (though not invariably) characterize certain stages of the homonymous and bitemporal field defects, as will be indicated in the later papers in this series.[1]

As a matter of fact there have been very few recorded examples of so-called binasal blindness of any type, and it is perhaps well to bring the subject under discussion if for no other reason than the rarity—according to some the impossibility—of the condition. Though scattered illustrations occur in the literature—we have found 22 examples—no specific communication, dealing with the subject in general, seems to have appeared since Shoemaker's brief résumé in 1905, when he gave an additional record of a personal observation.[2]

Unfortunately the etiological factors in the majority of the reported cases are largely a matter of presumption. In a few instances the finding has been ascribed to a *bilateral central lesion* (3 cases). It has been observed in association with *tabes* (1 case), with *fracture of the base* (3 cases), with *syphilitic disease about the chiasm* (1 case), and with advanced *arteriosclerosis*

[1] In the absence of choked disk, a unilateral nasal hemianopsia with sharp vertical meridian is, of course, possible, and examples occur in our hypophysial series. It is either an early or a late sequel of homonymous hemianopsia produced by a growth near the chiasm: an *early sequel* when the lesion is so situated as to primarily compress the lateral aspect of one optic nerve peripheral to the chiasm (1 case); a *late sequel* when vision has become completely lost in the eye with temporal hemianopsia, owing to late destruction of the optic nerve peripheral to the chiasm (5 cases).

We have had, moreover, one remarkable case of clean-cut unilateral nasal (right) hemianopsia with a central lesion (right temporal lobe tumor), the fields of the contralateral eye showing normal peripheries. The condition persisted for some months before constriction of the left temporal field began to be evident. This goes to show that the anatomical position of the tracts for the corresponding halves of the two retinæ in their geniculocalcarine course do not exactly correspond. This will be more fully considered in the last paper of this sequence.

[2] William T. Shoemaker: "Binasal Hemianopsia," etc. *New York Med. Jour.*, 1905, lxxxi., 215.

(2 cases). In fully 50 per cent., however, of all the recorded examples it has accompanied a so-called *neuroretinitis*, or other supposed inflammatory disease of the optic nerves, often in association with a definite brain tumor syndrome.

Central lesions.—Whereas in the case of homonymous or of bitemporal hemianopsia a single lesion may obviously account for the field defects, in the condition under discussion it is necessary to postulate two symmetrically disposed lesions somewhere in the visual pathway. Such an occurrence as a symmetrical vascular lesion (thrombosis, embolism, or hemorrhage) limited to a portion of the geniculo-calcarine fibres on each side seems highly improbable, though it has been offered as an explanation of a few of the earlier recorded cases (*e. g.*, by von Graefe and by Herschel). In a short paragraph von Graefe[1] mentions that he has seen only one case in which the outer half of each retina was paralyzed, and he cursorily mentions the finding as one of the bizarre effects of central lesions.

Other examples have been attributed to a toxic disorder which spares certain fibres and selects others, in a fashion similar to the system degenerations of the spinal cord. A case cited by Daae (1869) as one of binasal hemianopsia (no fields given; no post-mortem examination), in which the disorder was familial, may possibly belong in this category, and we have seen an example of a similar condition, in which, however, an implication—possibly a mechanical one—of peripheral rather than of central neurones seems the more likely:

> Surgical No. 29735. The patient, aged 36, an accountant, was referred, April 26, 1912, by Dr. William E. Bruner, of Cleveland, with the complaint of "failing vision." A brother, a sister, and a nephew are similarly affected. The personal history is seemingly without special significance.
>
> An impairment in vision was first observed in July, 1911, and has been steadily progressive. Reading vision was lost in September. Since that time a series of charts taken by Dr. Bruner shows that a primary central scotoma was followed by loss of nasal vision, the advance being fairly symmetrical in the two eyes. Achromatopsia for red and green was an early feature.

[1] "Ueber die Untersuchung des Gesichtsfeldes bei amblyopischen Affectionen." *Arch. f. Ophth.*, 1858, ii., 258–298.

Examination of the eyes on admission showed marked pallor of the disks, especially on the temporal sides. There was no measurable swelling, but the margins were slightly hazy and there was an appearance of new tissue formation in the cups, obscuring the lamina cribrosa. V.O.S. $\frac{2}{200}$; V.O.D. fingers at six inches. Fields show a peripherally disposed bitemporal crescent of preserved vision (*cf.* Fig. 26). There was a clean-cut hemianopic pupillary reaction.

The sella was normal, but, as Dr. Bruner first observed, the X-ray showed an extraordinary distention of the

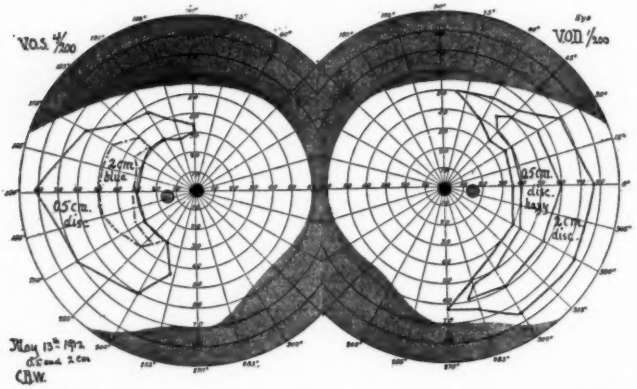

FIG. 26. Binasal hemianopsia in a case of von Leber's familial amaurosis. Complete achromatopsia, right; perception for blue retained on left for *2cm* discs.

sphenoid cells. They had been opened and drained, on the presumption of an existent sinusitis.

Dr. de Schweinitz, who had seen the patient, concurred with Dr. Bruner in the diagnosis of hereditary amaurosis (von Leber), but as some doubt had been raised in regard to the presence of increased intracranial pressure, a right subtemporal decompression was performed *May 1, 1912*, disclosing a brain free from tension but exceedingly œdematous.

A slight subjective improvement in acuity followed the operation, with some widening of the fields for the right eye.

This case will be reported in detail by Dr. Bruner, whose original discovery of the cranial changes may well account for the disorder not only in this patient but in other members of his family. It is cited here mainly to contrast the position

of the bitemporal area of preserved vision (*peripherally* disposed) with that in our series of tumor cases, in which the binasal blindness (*centrally* disposed) is the outcome of atrophy secondary to an advanced grade of choked disk.

Peripheral lesions.—In view of the position of the uncrossed fasciculi throughout the extracerebral course of the visual path, as established by Henschen and supported by Rakowicz and others, one can conceive of the exclusive bilateral involvement of these bundles only on the basis of two distinct and symmetrically disposed lesions which implicate the outer aspect of the optic nerves or tracts in the vicinity of the chiasm.

Anatomical conditions favoring a bilateral disturbance of this sort have been looked for, and Wilbrand and Saenger have described certain septile or pial processes which lie externally and penetrate the intracranial portion of the two nerves. To an inflammatory involvement of these processes binasal hemianopsia has been attributed by some.

Another possible source of a symmetrical lesion was suggested 40 years ago by Herman Knapp[1] on the basis that pressure upon the sides of the chiasm by *sclerosed internal carotid vessels* might produce a binasal blindness. Knapp's patient was observed in the days before accurate perimetry and consequently no fields accompany his report of the case, which came to autopsy and in which sclerosis of the Willisian vessels was found. The patient had had a choked disk and under antiluetic measures the roughly tested constriction of the visual fields disappeared.

Shoemaker in his comment on Knapp's explanation of the case says that the "post-mortem demonstration of the sclerosed vessels pressing upon the sides of the chiasm made almost irresistible the conclusion that this pressure caused of itself the binasal hemianopsia, which we now know to be impossible."[2] Nevertheless, in Shoemaker's own case—a patient with

[1] Herman Knapp: "Defects in the Field of Vision and their Connection with Diseases of the Heart and Brain." *Arch. Scient. and Pract. Med. and Surg.*, 1873, p. 293.

[2] It appears that Shoemaker, Rakowicz, and also Wilbrand and Saenger place a very strict construction upon the term "chiasmal." If the vascular constriction under discussion occurs *at* rather than *near* the chiasm, some fibres of the crossed fasciculi must doubtless suffer together with the uncrossed bundle.

pronounced arteriosclerosis—it would seem that he is not disinclined to attribute the visual-field defects to a similar condition, though he includes the case among those due to inflammatory disease of the optic nerves. Knapp's explanation of the rôle played by the diseased vessels is assuredly the most appealing one, but after some discussion it was abandoned by Herschel in the case reported by him,[1] in favor of a symmetrical intracerebral hemorrhage (no autopsy).

A remarkable example of what we are inclined to ascribe to a similar condition (also uncertified) may be of sufficient interest in this connection to justify the following recital.

Surgical No. 27163. *General arteriosclerosis. Blindness with primary involvement of nasal vision in each eye, presumably from pressure of sclerotic vessels. Partial restoration of vision in left eye after thirteen days of total amaurosis.*

January 5, 1911.—Miss M. P., aged 52 years, referred by Dr. S. G. Dabney of Louisville, Ky., with the urgent complaint of threatened blindness.

She has had occasional severe headaches with dizziness for the past few years.

Two years ago she experienced some soreness and pain in the right eye, followed by an abrupt lowering of vision, involving primarily the upper nasal field and advancing to complete blindness in four days: this has persisted.

She retained normal vision in the left eye until five days ago, when she began to experience exactly the same sequence of symptoms in this eye that she had two years before in the right, namely soreness and pain with rapidly failing vision.

Physical examination other than for the condition of the eyes reveals nothing of moment aside from the *generalized arteriosclerosis* with high systolic pressure of 190 to 200*mm* of Hg.

Ophthalmological notes (on admission).—She complains of a sensation of pressure and pain in the left globus. *Pupils:* Wide dilatation, left slightly smaller than right. Very slight reaction to bright light persists on the left. No oculomotor disturbance. Some dilatation of venules of lids. No exophthalmos.

Fundi:—Right disk completely atrophic; vessels small; physiological cup deep and showing new tissue, though not sufficient to completely obscure the lamina cribrosa. Edges

[1] Herschel: "Hemianopsia Nasalis." *Deutsch. med. Wchnschr.*, 1883, ix., 232.

of the disk are broken and surrounded by pigment. *Left disk* swollen about 3 D., except at the middle of the temporal side, where it is comparatively flat and shows evidences of atrophy. Physiological cup practically obliterated by œdema, and lamina cribrosa not discernible. Extreme venous tortuosity. Arteries small. One thin hemorrhage alongside of the superior nasal artery. Maculæ clear and some degree of sclerosis of the arteries of both eyes.

Fields, fortunately taken on the afternoon of admission, showed that the movement of a large 4*cm* white test object could be made out in the temporal field of the left eye. No central vision. Impossible to count fingers.

On the following day, *January 6, vision was totally lost, and there was no further light perception whatsoever until January 19—an interval of thirteen days.*

Provisional diagnosis.—A primary optic atrophy with low grade of choked disk (insufficient to account for the blindness) *associated with arteriosclerosis.*

The patient was seen with Dr. James Bordley, and we believed that the sclerosis of the retinal vessels accounted for the condition and that there was no possibility that operative measures would restore her vision. However the choked disk justified the assumption that there was some associated pressure disturbance, and the forlorn hope of surgical intervention was resorted to.

January 9, 1911.—Operation.—Left subtemporal decompression, disclosing sclerosis of cortical vessels and an excess of cerebrospinal fluid under moderate tension.

Post-operative notes.—January 11. Relief from sensation of pressure and pain in the left eyeball. Complete amaurosis. No vision for bright light thrown in left eye. Left pupil still somewhat smaller than right. No pupillary reaction whatsoever. Blood pressure lower.

January 19.—Can see moving object (large white card) in the upper temporal field of the left eye. (The patient is confident that vision was last lost in this area and that the same is true of the other eye two years before.) Subsidence of œdema: swelling about 1 D. Pupils still dilated: left slightly smaller than right. Apparently no reaction whatsoever to light and accommodation.

January 20.—Further subjective sense of improvement in vision. Can see the electric light when it is turned on in her room.

January 23.—Still further subjective improvement. Can count fingers in upper temporal field.

January 24.—Fundi: No measurable swelling in the left eye. Nasal margin becoming clear. *Fields* (4*cm* white card) show widening of area. No color perception, though

she can now distinguish lighter from darker moving objects.

January 29.—Further subjective improvement. Can distinguish objects of furniture in her room. *Pupils* still dilated; right larger than left. Definite reaction to light thrown in left eye; also a consensual reaction from left to right; none right to left. *Fundi:* Nasal margin still clear, though some tortuosity of veins persists. No measurable swelling. *Fields* (white 4*cm* card) show still further

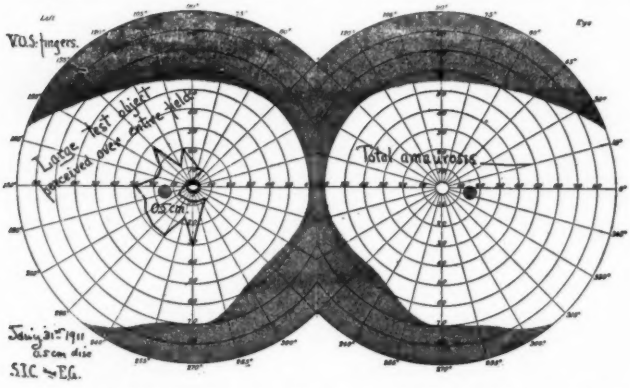

FIG. 27. Fields of January 31st, for 0.5*cm* test object, twelve days after beginning return of left temporal vision. Fields taken by S. J. C., corroborated by E. G.

widening, spreading onto the upper nasal field. A 1*cm* disc is discernible over a small area around the blind spot.

January 31.—*Fields* with white disc (2.5 by 2.5*cm*) show fairly intact form periphery with a central scotoma; and over a small, irregular temporal field (Fig. 27) the 0.5*cm* disc is clearly discernible.

February 7.—Left pupil reacts promptly to light and accommodation. Prompt consensual reaction left to right. *Fundus,* aside from atrophy and arteriosclerosis and slight evidence of new tissue in the cup, is normal. *Fields* (0.5*cm* disc) show marked improvement. Central scotoma persists. Color perception beginning to be apparent for large objects, though colors are not properly recognized, red appearing brownish and blue lavender.

February 10.—Acuity:—V.O.S. $\frac{8}{200}$.

February 17.—Field with 0.5*cm* disc shows further improvement (Fig. 28). Large sheets of red and blue named correctly. V.O.S. $\frac{8}{200}$. Discharged.

Without post-mortem examination one cannot definitely ascribe such a condition as was encountered in this patient to the lateral pressure of sclerosed vessels. It is, however, the most likely presumption. The unexpectedly happy result of the decompression is naturally explained on the following basis.

(1) A rigidity from sclerosis of the internal carotid vessels had already led to blindness with primary atrophy of the right opticus. (2) A cerebral œdema (common enough in cases of cerebral arteriosclerosis) caused a slight increase

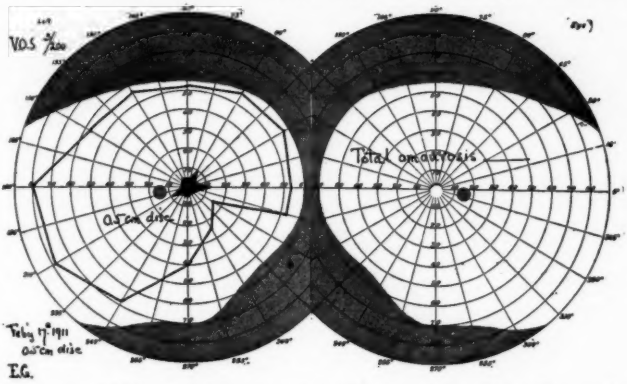

FIG. 28. Fields of February 17th, with 0.5*cm* test object, five weeks after operation.

of intracranial tension, enough to produce a low grade of papillœdema in the left eye. (3) The swollen brain, possibly associated with some hydrops of the third ventricle, served to crowd the left optic nerve, which had heretofore escaped, against the adjoining sclerosed vessels. (4) The left decompression not only afforded relief to the general tension disturbances, but possibly encouraged at the same time a certain amount of outward dislocation of the left temporal lobe—sufficient to pull the branches of the carotid trunk, and possibly the vessel itself, away from the nerve. (5) During the period of unrelieved constriction the uncrossed fibres from the temporal retina producing nasal hemianopsia naturally suffered more seriously than the crossed fibres from the nasal retina.

Far the larger number of recorded examples of so-called

binasal hemianopsia have been associated with and attributed to an "*inflammatory*" *disease of the nerves*—optic neuritis, neuro-retinitis, retrobulbar papillitis, and so on—terms, in the majority of instances, which indicate a process, as we now conceive of it, due primarily to a mechanical rather than to a toxic or inflammatory agency.

Among the disorders which have been recorded as accompanying cases of binasal hemianopsia, *syphilis* has been mentioned. A gummatous meningitis in the neighborhood of the chiasm is doubtless capable of producing this as well as other bizarre forms of field defect, and may be dismissed with a word. We have seen a number of examples, though none with a binasal type of defect. One very remarkable case showed, on about twenty different observations covering a period of six months, a typical bilateral *superior hemianopsia* with inclusion of the macula. One or two examples, moreover, of a similar type of defect occur in our hypophysial series, when an adenoma of the gland has enveloped the nerves and involved the ventral fasciculi for both temporal and nasal retinæ more seriously than the dorsal ones.

The instances of binasal hemianopsia recorded (usually without accompanying charts) in the literature and associated with so-called inflammatory disorders of the nerves, from a study of the case reports would seem for the most part to be unquestionably cases of *brain tumor*, and in one or two of them which were certified by autopsy an internal hydrocephalus is recorded (*e. g.*, Eskridge, Schmidt, and Wegner).[1]

An advanced grade of choked disk, often the sequel of an obstructive hydrops of the ventricles, has been shown to be the forerunner of the binasal blindness in the cases which we have recorded.

It may be recalled that the suggestion was made by Oppenheim that an extreme distention of the third ventricle due to secondary hydrocephalus might serve to press upon the posterior and medial aspect of the chiasm and tracts in such a way as to involve the crossed fasciculi and thus produce a

[1] The ophthalmologist, it may be noted, is not very likely to make use of perimetry with a patient suffering from an advanced tumor syndrome near the time of death, for the individual is apt either to be blind or too ill to give trustworthy responses, if the examination is possible at all.

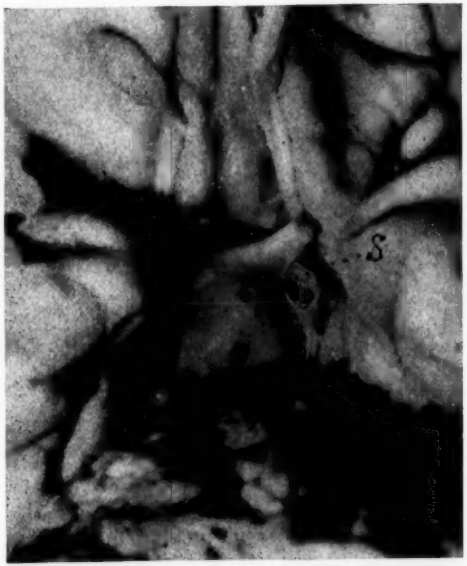

Fig. 29. Showing (natural size) the extreme distension of which the third ventricle is capable in the case of a cerebellar tumor producing obstructive hydrocephalus in a young individual—without marked choked disk or change in visual fields. "*S*" indicates point of attachment of hypophyseal stalk.

Fig. 31. Coronal section through distended third ventricle posterior to chiasm, in the case of a large endothelioma occupying the right hemisphere. Ventricular distension largely limited to the third ventricle. This has caused lateral distortion of optic tracts, which are externally grooved by carotids *C*, *C*. Lateral ventricles *V* are mere distorted slits.

bitemporal hemianopsia. This, however, seems never to occur, for the chiasmal cross-roads are capable of a very considerable degree of slow dislocation without any direct evidence of functional disturbance, so far as can be disclosed by the perimeter. When the advancing changes brought about by a choked disk have been palliated either by operation or by a spontaneous diastasis of the sutures such as may occur in the young, the fields may remain normal in spite of a high grade of hydrocephalus (Fig. 29).

It is quite otherwise, however, when with an internal hydrocephalus the process has been allowed to advance, for with the crowding of the cerebrospinal fluid into the subarachnoid spaces of Schwalbe's sheath the persistent neuro-retinal œdema leads to round-cell infiltration, to the formation of connective tissue, to contracting scar formation, and to the so-called secondary atrophy with some recession of the swelling.

This process under ordinary circumstances causes, as would be expected, a gradual destruction of the fibres, with a concentric contraction of the visual fields. After a certain point, however, as the process advances it appears, from our cases, that the uncrossed fasciculi and the macular fibres suffer more than the remaining fibres, (*i.e.* those to the nasal retinæ), and there is doubtless some underlying anatomical basis for this phenomenon.

Were the shrinkage of the fields influenced solely by the contraction of the scar tissue, one might presuppose that the crossed fibres which originate from the nasal half of the retina and enter the nasal side of the disk would suffer most, for this is the side, corresponding to the chief ampulla formation (Horsley) of the sheath of Schwalbe, on which the œdema first appears in the nerve head and consequently where the process is oldest. On this assumption a complete bitemporal, rather than a complete binasal, blindness would characterize the late stages of the process; and this is contrary to the facts.

However, it is difficult or impossible to attribute the ultimate binasal blindness to a lesion confined alone to the nerve head and retina. Another factor must come into play, which elsewhere in the course of the nerve affects the uncrossed fasciculus from the temporal retina more markedly than the crossed fibres from the nasal retina. We wish to suggest that this

may be due to pressure of the dilated ventricle which forces the exposed nerves or tracts adjoining the chiasm (not necessarily the chiasm itself) downward and outward against the

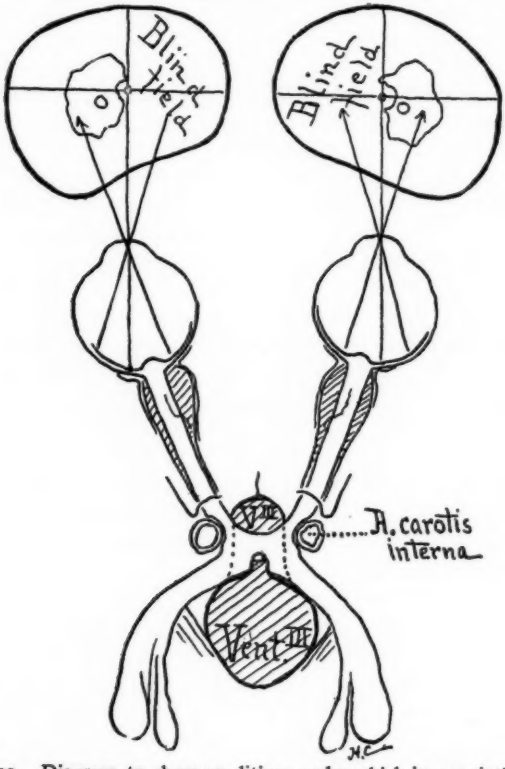

FIG. 30. Diagram to show conditions under which in association with choked disk a third ventricle distention causes dislocation of the optic nerves with resultant lateral indentation by the carotid arteries.

resistant carotid vessels. The accompanying diagram (Fig. 30) may make this clear.

A number of brains in our collection, removed after hardening *in situ*, give support to this view.[1] Thus in Figure 31 is

[1] It should be interpolated in this connection that only in the case of brains which have been effectually hardened with intracarotid injections

shown a coronal section passing through a distended third ventricle posterior to the chiasm, the external aspect of the tracts showing a deep indentation at the point of vascular crossing. In other examples the vascular crossing occurs farther forward and the nerves rather than the tracts are involved, for not infrequently the distended third ventricle assumes an hour-glass form (*cf.* Fig. 16, Case VIII) and bulges forward between the hemispheres anterior to the chiasm.

The patient whose brain is shown in Figure 29 was so nearly blind from advanced secondary atrophy that it was impossible to map out any fields of vision. She nevertheless showed pupillary reactions from the temporal retina and could appreciate a ray of light from the temporal fields only.

Unquestionably some anatomical condition accounts for the fact that with an advancing choked disk which has reached the stage at which recession of the swelling occurs, owing to cicatricial contraction, the fibres which are last destroyed are those originating from the nasal retina in the vicinity of the optic papilla. Whether these particular fibres enter the nerve head in some specially protected—possibly central—position, or whether they are scattered throughout the crossed fasciculus, as would seem to be the case from our sections, we will not venture to say.

The macular fasciculus resists the advance of the secondary atrophy almost as long as do these fibres of the uncrossed fasciculus. This macular fasciculus, moreover, as it enters the outer side of the papilla separates the bundles of fibres from the upper and lower quadrants of the peripheral temporal retina—that is, the dorsal and ventral bundles which later combine in the nerve to make the uncrossed fasciculus (Fig. 32). Indeed, the macular bundle does not become buried by the fusion of these two portions of the uncrossed fasciculus until some distance back in the orbital course of the nerve (Fig. 32, B), and even then retains a laterally excentric position until near the chiasm (Fig. 32, C). For convenience of reference the accompanying familiar diagrams are reproduced.

It is well known that the œdema in the early stages of a

of formalin before removal can any reliance be placed upon matters relating to vascular constrictions. This has been emphasized by one of us in another connection.

choked disk first makes its appearance on the nasal side of the optic papilla and in a receding process disappears last from

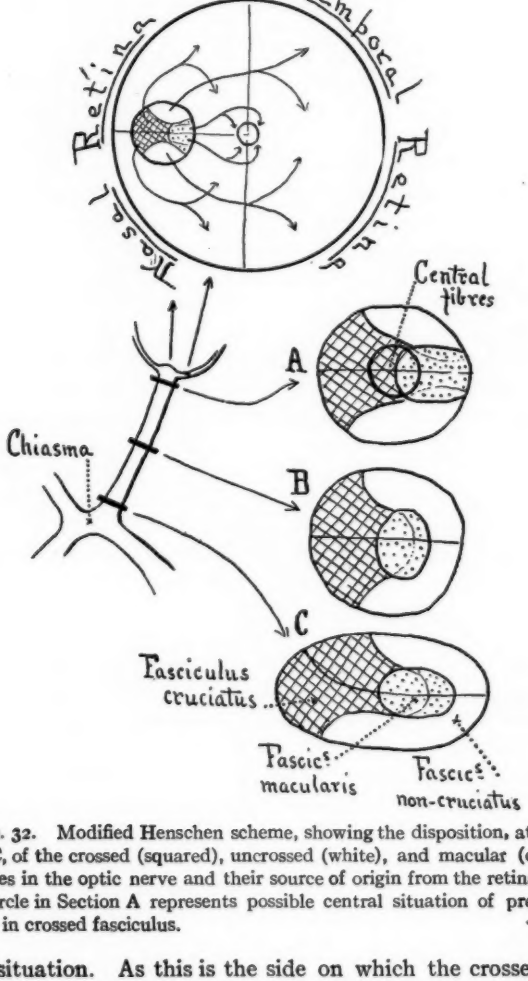

FIG. 32. Modified Henschen scheme, showing the disposition, at A, B, and C, of the crossed (squared), uncrossed (white), and macular (dotted) bundles in the optic nerve and their source of origin from the retina. Inner circle in Section A represents possible central situation of preserved fibres in crossed fasciculus.

this situation. As this is the side on which the crossed fasciculi leave the retina, one might surmise that the perimeter

would show evidence of degeneration in these fibres before its occurrence in others; but if this were so the primary change in the visual fields in cases of declining choked disk would tend toward a bitemporal constriction.

Moreover, did the new-tissue formation at the papilla shut down in centripetal fashion on the nerve head and implicate the fibres from the periphery inward, we would expect an early involvement of the macular bundle with a central scotoma as a common instead of a rare early feature.

It may be noted that the macula itself remains relatively free from œdema even when the latter spreads widely over the retina, and possibly the macular bundle may in some way escape from the cicatricial constriction as the swollen papilla declines.

Though Henschen's diagrams were doubtless meant to be little more than schematic it is conceivable that the more centrally placed fibres (*cf.* Fig. 32, A, in circle) may represent the ones preserved in the tumor cases that we have recorded, but it is remarkable that they should have a distribution from a retinal area near the optic disk and thus give a small field of vision, which usually centres around the blind spot.

Of these two views which are suggested in explanation of the tendency towards the binasal character of the blindness which we have observed in the late stages of a choked disk, we are at present inclined to lay chief stress on the influence of the bilateral arterial constriction.

CONCLUSIONS.

A constriction of the field of vision due to a destruction of fibres more complete from the temporal than from the nasal half of the retina and justifying the designation of nasal hemianopsia has been observed in from 5 to 6 per cent. of a series of 300 cases of brain tumor.

It occurs as a late sequel of an advanced choked disk in the stage of recession of the œdema; and a bilaterally symmetrical process, implying an equal degree of involvement of the two eyes, suggests as a rule a distant, often a cerebellar, lesion with secondary hydrocephalus.

An internal hydrocephalus with distention of the third ventricle crowds the optic nerves downward and outward

against the carotid vessels which transversely indent the outer aspect of the nerves. In this way the uncrossed fasciculi to the temporal retinæ, and the laterally placed macular bundle as well, suffer from a mechanical pressure "block" in addition to the diffuse anatomical destruction of fibres throughout the nerve in consequence of the contraction of the new-tissue formation in the long-standing choked disk.

A similar involvement of the uncrossed fasciculi in the absence of tumor may occur, as originally suggested by Knapp, through the pressure effects of diseased and sclerosed vessels. In this event the coincident constriction of the fields shown by our series of tumor cases would hardly be expected, owing to the fact that with cerebral arteriosclerosis a choked disk, though common enough in moderate degree, rarely advances to the stage which we have shown to be associated with the form of binasal hemianopsia under discussion.

A SIMPLIFIED GRAM TECHNIQUE.

By Dr. WALTER HAMILTON SNYDER, Toledo, O.

OPHTHALMOLOGISTS do not use the Gram stain as much as it deserves. This I believe to be due to the fact that it is so much trouble to work through, due to the necessity of the preparation of the anilin oil solution at each time or the certain deterioration of the many carbolic solutions. Many endeavors have been made to produce a more stable solution, which would have the selective value of the Gram. The original Gram prescription for the watery-anilin-gentian violet does not stain deeply enough and will also deposit. Jadassohn has modified this, as has Czaplewski, but they all contain the watery solution of carbolic acid, and this solution is constantly undergoing deterioration. Loeffler found that the methyl-violet 6B gave a better result than the gentian-violet. Gentian-violet is not a definite chemical substance but a mixture of crystal-violet, methyl-violet, and dextrin. Methyl-violet can be substituted with advantage in all gentian-violet formulæ. This modification of Loeffler will keep longer than any I know of and does not need to be made freshly at the time of use. But in a month or so, if one examines the solution critically, it can be seen that it is slowly deteriorating.

Imitating the Wright stain and others made along similar lines without water, for dilution at time of using, I have modified this stain by melting carbolic-acid crystals and then dissolving the methyl-violet 6B, Gruebler, and making a solution with absolute alcohol. This solution is perfectly stable and will keep indefinitely. It is to be diluted, one to four (1:4), at the time of use. I have felt for some time that the ordinary, most-used stain for the ophthalmologist should be the Gram, because it separates in two distinct classes the

bacteria of which we desire to know most. I think, however, that most ophthalmologists use methylene-blue, but this lacks the distinctive separation, which is the chief value of the Gram.

I will describe the method used in my office for the identification of bacteria. We keep on the treatment table a Coplin jar, loaded with sterile slides. On one end of these slides is a small label, 20×10*mm;* this is for the purpose of identification, and the serial number of the patient is usually written upon it.

Then, I purchased of the dental supply house 50*mm* of irido-platinum wire about the thickness of an ordinary pin. This I had bent up in a small triangular-shaped loop, 3×2*mm*, and the same dental supply house soldered the loop shut with gold. After soldering, it was polished and burnished on the buffing wheel until perfectly smooth. For a handle, instead of the ordinary glass rod, I use a dental metallic broach-holder. This broach-holder is 7½*cm* in length and the irido-platinum needle can be fastened at any place in its length. The advantage of the irido-platinum over ordinary platinum is its stiffness, thus allowing those stroking movements to be made on the conjunctiva, dislodging epithelial cells in which the gonococci are found after they are not present in the secretions, and which are absolutely necessary to determine when a case of ophthalmia neonatorum is safe to discharge.

A case, for instance, is handled as follows: A slide is taken and the serial number of the patient marked on it. Two drops of distilled water in formalin, 1: 1000, kept in a dropper bottle, are placed one in the middle and one at the end of the slide. The irido-platinum loop is then used to secure some of the secretion, either by stroking or the ordinary method, which is mixed evenly with the drop of distilled water. If it is desired, if both eyes are suspected, one can put the secretion from the right eye in the drop in the centre of the slide and that from the left eye in the end drop. This is then taken to the laboratory and a drop of absolute alcohol placed on each mixture of the secretion. The advantage of absolute alcohol over drying by passing through a Bunsen flame is that any one can do it successfully, while I find it very easy for a lay assistant to cook the secretion and alter its characteristics. The absolute

alcohol soon evaporates, leaving a thin smear, securely fixed to the slide. I have found it advantageous to keep all stains in TK amber-colored bottles. I prefer the smaller sizes (30*cc*) for the stains, and the larger sizes (60*cc*) for the Lugol's, ethyl-alcohol, and nitric-acid solutions. Three or four drops of distilled water are dropped upon the slide, which is laid across one half of a petri dish, then one drop of the afore-mentioned alcoholic solution of the methyl-violet 6B (I have found it better to add the stain to three or four drops of the water than the reverse, as is done in the Wright stain). There is great danger in careless hands of evaporation of the alcohol, and a black deposit will be thrown down before one can add the water to the stain. This is entirely overcome by adding the stain to the water. In Wright's method the methyl-alcohol, used to dissolve the stain, acts as a fixative; but I have preferred, in this technique, to use the absolute alcohol separately, especially as this procedure should be arranged for lay assistants to work. The alcoholic solution of the methyl-violet 6B stains almost instantaneously and should not be left on too long. It usually stains strongly enough that it can be washed at the tap. It is of greatest importance to have a thin, uniform smear for the use of the Gram stain, more so than in any other stain of which I know. The methyl-violet is now washed off and the Lugol's solution dropped on from a dropping bottle. This is left on only a few seconds and then, without washing, decolorize with absolute alcohol until no color washes off. It is then washed thoroughly in water, and to the three or four drops of wash water still covering the smear, I add a drop of weak fuchsin in alcohol, as a counterstain, preferring this red counterstain to the ordinarily used Bismarck brown. It is then blotted with lintless blotting paper or filter paper and placed under the microscope.

With a low power (Zeiss AA or even the DD), without a cover-glass, I search for what appears to be a good place in the smear for examination. On this field is then placed a drop of cedar oil and the oil immersion focused.

The only dish that has been soiled is the half of a petri dish, which can be put in the sink and water let run on at once, to cleanse. The dropping bottles are quickly replaced and the

entire staining can be done in five minutes, thus allowing a diagnosis to be made before treatment is given the patient. The entire procedure, including the focusing of the oil immersion, can be done by a lay assistant. In case there are different ones working this through, it is best to have a technique something like the following.

1. Stain 25 seconds with alcoholic methyl-violet 6B.
2. Wash with water. (Can be done under tap.)
3. Lugol's solution, 15 seconds. Then, without washing,
4. Decolorize with absolute alcohol until no color washes off.
5. Wash in water.
6. Counterstain with 5% watery safranin or weak fuchsin for 5 seconds.
7. Thoroughly wash with water, dry, and examine in water, oil, or Canadian balsam, with or without coverglass.

This will make more uniform technique and with care all the specimens will be stained with great uniformity. I think the only reason the Gram has not been more used is because of the annoyance of mixing the anilin oil solution and the many dishes soiled in the procedure. We have also found that slides, and not cover-glasses, are best used for this work. After the specimen is examined, as a routine, we drop it into a wide-mouthed jar filled with nitro-hydrochloric acid. This effectually disposes of any possibility of infection with dangerous material and chemically cleans the slide. The slide can then be thrown away or recovered for further use by washing.

To sum up the advantages of this method, we have: First, the slides are always ready for use, with a proper stiff needle which can be easily sterilized, the needle and holder fitting inside of the slide case. Second, the entire staining procedure could be carried out on one's desk, as a few drachms of water are used and there is no muss or soiling of the fingers. Third, the solutions keep indefinitely and are always ready. Fourth, the process can be carried out by one's secretary and the slide put under the microscope, ready for the physician. Fifth, this method will induce many ophthalmologists to use the

Gram stain, which is the logical one for them to use, when they would not if they had to go through the older methods of procedure.

My experience has been that in eye cases a prolonged search of many fields is necessary to determine what the infecting organism is unless the eye has not been treated or is at the height of its inflammation, and even then it may not be possible to positively determine. However, enough can be learned to reward us for the work. By looking the smear over with a dry high power one can soon select a place which is quite characteristic, and usually one or two fields, with not too high an eyepiece, will reveal the bacteria which caused the infection if they can be found at all. At times a prolonged search will be necessary and with more than one searching a mechanical stage is a convenience.

FORMULÆ.

Methyl-violet stain:

Melted carbolic-acid crystals,	12.5*cc.*
Absolute alcohol (ethyl),	25.0*cc.*
Methyl-violet 6B, Gruebler,	1.0 gramme.

Dissolve, keep in a warm place for 24 hours, and filter.

Lugol's solution:

Iodine crystals,	1 part.
Potassium iodide,	2 parts.
Distilled water,	300 parts.

ADDITIONAL EXPERIMENTS ON THE EXCRETION OF HEXAMETHYLENAMINE IN THE OCULAR HUMORS.

By Dr. LLOYD B. WHITHAM, Baltimore, Md.

FOLLOWING Crowe's (1) original findings, Gradle's (2) interesting paper, reviewed in the last issue of the Archives of Ophthalmology, should stimulate others to pursue experiments along this line. For we cannot but hope, in considering the marvellous advance of ocular therapeutics during the last few decades, that a satisfactory internal antiseptic, acting through the circulation, will be found for the eye, as it has been for other structures. At the present there seems to be some value in hexamethylenamine, limited as it must be in its field of usefulness. Gradle, working on rabbits, has found that it is excreted as such and as formaldehyde in the tears and aqueous humor, that its excretion is increa ed by paracentesis of the anterior chamber and by the use of atropin locally. He further determines that the pneumococcus is able to grow in this forminized aqueous humor.

These experiments are interesting; they, at least, open a gateway to a new line of thought, and they have led the writer to make a few additional observations, besides absolutely confirming the original author's notes. As in Gradle's cases rabbits were used, but, by means of a medicine dropper, the writer fed a saturated solution of the official hexamethylenamine instead of urotropin, and tested the vitreous as well. The Hehner (3) test for formaldehyde was used and the results follow:

1. Formaldehyde present in aqueous and faintly in vitreous, after four hours, and without paracentesis of anterior chamber.

2. This was greatly increased in both media of an eye after one instillation of 10% dionin solution.

3. This was markedly increased in both aqueous and vitreous of an eye treated with one subconjunctival injection of normal salt solution.

4. Staphylococcus albus, from an enucleated panophthalmitic eye, and a test-tube culture of bacillus coli were inoculated into some of the forminized vitreous. They both multiplied in the incubator, but the growth was slower and thinner than would otherwise be the case.

5. The writer also found that the crushed optic nerves responded very faintly to the test for formaldehyde, and thinks this probably due to cerebrospinal fluid in the sheath of same.

Burk (4) tells us that the metabolism in an inflamed eye takes place much more rapidly than in a healthy one, which leads the writer to venture the opinion that the strength of the excreted formaldehyde in these healthy rabbit eyes would be greatly increased were there an irritation or inflammation of their component structures, especially the iris or ciliary body.

Before attempting any application of this to ocular therapeutics, it might be well to briefly review the latest conceptions of the pathological and physiological circulation of the aqueous, as proved by the uranin test (4), and the experiments of Leber and Rochat (5), viz., that during inflammation, the iris participates in the "filtration," together with the ciliary body; that normally these two structures, with the canal of Schlemm, also carry away this "filtration product" (6); and furthermore, that it circulates in the tissue of the iris, the capsule of the lens, and the endothelium of the cornea.

This leads to clinical surmises, although some of us, who have used it, in conjunction with other measures, can vouch for its action in the alleviation of certain conditions. The writer has used it repeatedly in keratitis and corneal ulcerations, and recalls one case, particularly, of immense, deep, central, sloughing ulcer, with hypopyon, which rapidly grew worse under all general and local medication, until, as a last expedient, hexamethylenamine was tried, when its progress was immediately halted and it soon healed with dense leucoma. He has also used it, among other drugs, in iritis, and considers

it a safe prophylactic to employ routinely before and after operations on the globe, for the reason that the anterior and posterior surfaces of the cornea, the iris, ciliary body, lens capsule, and vitreous (if experiments hold good) are constantly bathed in a semi-antiseptic fluid. Certainly it is reasonable to use it in sphenoidal cell inflammation with secondary optic nerve involvement; and might it not be given a trial in those rare cases of inoperable cysticercus of the vitreous? We must not forget that, in Mr. Arnold Lawson's (7) interesting case of metastatic corneal ulcerations with bacillus coli toxæmia which was successfully treated by serum therapy, urotropin was used in heavy doses. It is only natural to assume that the drug itself played a creditable part in the rapid improvement and cure which took place.

In low-grade and post-operative iridocyclitis, with dense cyclitic membrane, when iridectomy, or one of its substitutes, is almost certainly followed by a re-exudation and re-occlusion of the pupil, this drug might rationally be given a trial for a few weeks before operation, in the hope of quieting the inflammation in the ciliary body. In fact, might not post-operative infection be prevented by a long course of hexamethylenamine treatment before operation? Would it not put the eye in an "antiseptic condition," so to speak, and, by the preventive circulation of formalin solution, render unnecessary Ziegler's (8) curative method of injecting the same into the anterior chamber after infection has commenced?

The writer, agreeing with Gradle, believes that a forminized media, plus the normal antibodies of the system, would be able to withstand invasion by a moderately pathogenic bacillus. When the organism, however, has once secured a foothold, has propagated and become "acclimated" to its new environment, the drug is of no use.

Finally, all will agree that its value must be demonstrated clinically, not experimentally. When such progressive men as de Schweinitz (9) and Crampton (9) have used it and obtained brilliant results in cases of keratitis with hypopyon, iritis, rheumatic iritis, iridocyclitis, uveitis, traumatic keratitis, and with encouraging results in sympathetic ophthalmia, we must admit that the drug has a direct, preventive, bactericidal action in certain conditions.

The writer does not believe that its field of usefulness will prove large, but recommends its employment, empirically, as a prophylactic against infection, and as a direct therapeutic measure, together with other recognized medicaments, in corneal, iridic, cyclitic, and sphenoidal affections.

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DETAILS OF VISION OF 132 CASES OF INTRACAPSULAR EXTRACTION OF CATARACT.

By Lieutenant-Colonel HENRY SMITH, M.Ch., Indian Medical Service, Honorary Surgeon to his Excellency the Viceroy.

MR. EASON in the July number of the *Lancet*, 1911, writes a paper on Cataract Extraction, the basis of which is not his own personal experience but a paper published in the *Royal London Ophthalmic Hospital Reports*, vol. xvi., part iii., October, 1905, by Mr. E. Treacher Collins, a paper by Mr. Charles Higgins (*Lancet*, 13/4/07), a paper published by Major Kilkelly in the *Indian Medical Gazette* of May, 1910, on twenty-three cases operated on by me in his hospital in Bombay while at the Bombay Medical Congress, and on my monograph on the treatment of Cataract.

He complains that I have not published details of any series of cases. He puts the results of these Bombay cases against the results of Mr. Treacher Collins and Mr. Higgins in their papers above noted. It should be observed that Mr. Collins's cases and Mr. Higgins's cases received thereafter treatment from their operators and were reported on by their operators, and that my twenty-three cases were not under me but under Major Kilkelly, and were reported on by Major Kilkelly; so far the conditions are not analogous. It should also be observed that they were reported on by Major Kilkelly and Dr. Pontius, hostile witnesses, a fact which will be at once apparent to any one who reads the controversy which followed. It is strange that Mr. Eason read Mr. Kilkelly's paper and quotes it as bona-fide, but happens to have not read the remainder of the controversy in which these twenty-three cases were wiped out as of absolutely no scientific importance; neither does he quote the results of the thirteen cases I happened to have

in the hospital in the middle of the hot weather when I first replied to Major Kilkelly, and which were reported in the *Indian Medical Gazette*, July, 1910. The details of these are included in the 132 cases now reported on. The details of my remaining 119 cases noted below are as follows: In my recent slack season I did these cases *myself* (in the busy season I put all cases except complicated ones at the disposal of my pupils) with a view to writing this paper. The eyes were selected by me before operation as normal in every respect apart from cataract. I selected 150 thus for operation. Of these 119 turned up for examination. The remaining 31, when the dressings were removed at the end of ten days, were just the same as the rest and were to be brought to my bungalow in the evening for examination, but as is so usual with the native patients, when the dressings were removed, they slipped away to their villages without informing the hospital staff. It is, therefore, not to be inferred that the eyes of these 31 patients were in any way better or worse than those examined.

They were examined for vision from ten to twenty-one days after operation. They were examined partly by myself, and partly by my wife, who is a member of the profession and an ophthalmologist. A diaphragm was used behind the lens in all these cases in order to get the stupid patients to look through the proper part of the lens, and also to shut off the glare, which is much more trying in the intracapsular operation than in the capsulotomy one in the early stages owing to the clearer medium and consequently brighter light which reaches the retina.

Mr. Treacher Collins, referring to his results in the capsulotomy operation, says: "The writer doubts if by any other procedure for the removal of cataract full vision could be obtained in twenty-five per cent. of the cases with one operation." This is as much as to say that the world we live in is the best of all possible worlds. I quite agree with Mr. Treacher Collins as far as the capsulotomy operation is concerned; but considering that the intracapsular operation had been prominently brought before the profession at the annual meeting of the British Medical Association of 1903 and proved to be an eminently satisfactory and feasible operation, Mr. Treacher Collins's position is surely pessimistic.

Let us see the relative merits of this operation. In my 132 cases below noted, there was one prolapse of iris, one iris caught in one angle of the wound, and in three cases the cornea was slightly hazy. There were no drawn-up pupils. There was no case of iritis or of iridocyclitis. There was vitreous escape (a bead) in three cases. There was capsule left behind in one case (this case had $\frac{6}{12}$ vision). There were no other complications.

Details of vision.—Distant vision tested in 132 cases: $\frac{6}{12}$ in 2; $\frac{6}{9}$ in 3; $\frac{6}{6}$ in 26; $\frac{6}{5}$ in 22; $\frac{6}{4\frac{1}{2}}$ in 61; $\frac{6}{4}$ in 16.

Two were so stupid that though they could see distant objects and details of them well, we could not get them to understand what we wanted.

Details of 119 cases in which near vision was tested: Jaeger 1 in 10; thread needle with great ease, 14; thread needle, 84; thread needle with difficulty, 9.

The same two above noted were too stupid to get anything out of them.

Those tested with Jaeger type were English-speaking. The others could not read Roman or Urdu character; they were tested for distant vision with bull's-eyes, and for near vision the test used for them was to thread an ordinary cambric needle (not a darning or packing needle). The people who threaded a needle with ease were intelligent women and tailors. Those under classes "Thread needle" and "Thread needle with difficulty" were most of them old people not accustomed to threading needles and a number of them with shaky hands. It took on an average twenty minutes to make them understand what we wanted them to do. The intelligent people could tell us at once what they could and what they could not see. The others would try the patience of a Job. Threading a needle requires more senses than sight and is thus more difficult than reading Jaeger 1, but it was the most exacting test we could think of.

The lenses used were from plus 9 D. to plus 11 D. for distance. For near distance mostly plus 13 D.; a few required plus 14 D.

The patients were not examined for astigmatism but my experience is that the astigmatism in these cases averages about 0.75 D.

Mr. Eason attributes the superior vision of Mr. Treacher Collins's cases over that of Mr. Higgins's and others to the absence of anterior capsule in the former cases. By parity of reasoning the superior vision obtained in my cases is due to the entire absence of capsule both anterior and posterior, and to this also is due the absence of complications in my cases.

Mr. Higgins gives us full details of the vision of his 130 cases, but it is not fair to compare these either with Mr. Treacher Collins's cases or with mine as they were not selected before operation. But it is quite fair to compare mine with Mr. Treacher Collins's who states that his were selected as uncomplicated senile cataracts, but he only gives the general statement that 25 per cent. of them had vision equal to $\frac{6}{6}$ without needling and that he does not needle if the patient has vision $= \frac{6}{18}$ or better.

Considering that Mr. Higgins's cases were unselected and contained the usual proportion of eyes operable though diseased apart from cataract, his results seem to me to be as good as the first-class operator by the capsulotomy method may expect. Mr. Treacher Collins states that his two hundred cases were selected as uncomplicated apart from cataract. Mr. Eason in his comparison does not note this important fact. Mr. Treacher Collins gives us no idea as to the time after operation at which his visual results were obtained—an all-important fact in cases in which the capsule is left behind owing to the steadily growing obstruction of light by the capsule; for example, cases whose vision is $\frac{6}{6}$ a fortnight or three weeks after operation will seldom be more than $\frac{6}{12}$ after a year and $\frac{6}{18}$ after two years, which latter according to Mr. Treacher Collins does not require needling, a fact which indicates in itself that needling is regarded as an operation of considerable risk when operators by the capsulotomy method are satisfied with such poor vision. Mr. Treacher Collins designates $\frac{6}{6}$ as full vision. In my observation $\frac{6}{4\frac{1}{2}}$ or $\frac{6}{4}$ is much nearer normal or full vision.

In cases of intracapsular extraction the reverse order occurs, as after three months and more the vision is much better than it is at the end of three weeks, owing to the patient being less sensitive to glare, and owing to the cornea having resumed

its normal transparency. This is shown by a comparison of the 61 of my cases (uncomplicated apart from the escape of vitreous) which were kindly examined for me and reported on by Captain Lister from one to five years after operation:

$\frac{6}{9}$ in 4; $\frac{6}{3\cdot6}$ in 6; $\frac{6}{4}$ in 4; $\frac{6}{4\cdot6}$ in 5; $\frac{6}{5}$ in 4; $\frac{6}{6}$ in 33; $\frac{6}{8}$ in 2; $\frac{6}{9}$ in 3. Total 61.

These visual results were obtained with spherical lenses; a number of them are better than any reported on in my recent list. 56 out of 61 cases range from $\frac{6}{9}$ to $\frac{6}{6}$ with one operation. How does Mr. Treacher Collins's assertion stand in the face of these facts?

In intracapsular cases it is very important to impress on the patient that he should not use his eyes for any exacting work for three months after operation as they are liable to show signs of irritability from such causes. A case recently came before me, a European lady, who was given a shade at the end of fourteen days. On the fifteenth day she complained of considerable irritation and photophobia and general congestion was evident. In trying to discover the cause of this I found out with some difficulty that she had spent the previous evening with a hand lens reading an illustrated paper and examining the pictures. A few leeches to the temple and exclusion from light for a few days set matters all right. In connection with the after-treatment of intracapsular extraction cases I wish to point out that the first dressing should not be removed for ten days. Both eyes should be bandaged in order to reduce the movements of the eyeball to a minimum. The patient should be carefully carried to bed and should rest on his back for twenty-four hours and throughout should have a light diet. After four days he may be allowed to sit up in a chair. After ten days the first dressing should be removed, the lids carefully cleansed so as to avoid putting any pressure on the eyeball. Even then, though our Indian patients leave us owing to lack of accommodation, I much prefer to have the operated eye bandaged up from five to eight days longer without inspection. This is what my senior assistant terms "No after-treatment." Daily dressing and inspection and the use of drops such as is necessary in the capsulotomy operation are not only not necessary in the intracapsular owing to the absence of complications connected with capsule left behind,

but are very detrimental and are the cause of many failures. I cannot impress this fact too strongly on those who are commencing this operation. People who follow this method of after-treatment will find that prolapse of the iris will be much rarer than it would otherwise be. Dressing a general surgical wound every day would be called meddlesome surgery and would be courting complications. Let any one read a detailed statement of a series of cases of the capsulotomy operation by a few of the most leading cataract operators and consider the number of cases of post-operative glaucoma, of iritis, of iridocyclitis, of after-cataract that has to be dealt with, and the glaucoma and iridocyclitis which are frequently associated with the needling of after-cataract, all of which are unquestionably due to lens matter and capsule left behind, and compare these facts with the absence of these complications in intracapsular extraction, and I think he will come to the conclusion that, apart from the superior vision obtained by the intracapsular method, the latter is, from every point of view, much the more surgical proceeding. One of my pupils, an experienced operator by the capsulotomy method, writes to me: " The beginning, the middle, and the end of all our troubles are capsule left behind." Another writes to me: "I now look on capsule left behind as I do on fragments of stone left behind in the bladder after litholopaxy, namely, that I have done an incomplete operation." Mr. Eason says: " Time alone will show whether the latter operation [intracapsular extraction] will be generally adopted or whether its success depends alone on the peculiar dexterity of Lieutenant-Colonel Henry Smith himself." Time is already showing that the success of this operation does not depend on the peculiar dexterity of any man. It is being extensively practised in India and is rapidly extending and threatens to render the capsulotomy operation as nearly extinct as litholopaxy has rendered lithotomy in India. Only a few of my pupils have commenced to write; the others will do so in due course. Time is also showing that the demand of the people of India is for this operation owing to the superior results obtained by it, as evidenced by the steady increase in numbers in the hospitals in which this operation is performed and the stationary or declining position of the hospitals in which the

capsulotomy operation is the operation of election, although *very* few patients know what operation is performed, while the dexterity of the operators by the capsulotomy method in India is probably unsurpassed by any one in the world owing to their vast experience. That it will eventually be adopted outside India is another matter. The operators outside India who have not had a special course of training in the manipulative art connected with it, or the operator who has not had such training and whose experience is limited to a hundred cataracts a year or less, will be well advised to avoid this operation. India should shortly be able to supply the British Empire with skilled operators able to teach this art.

One of the leading ophthalmologists of the world not in India, after having spent several days with one of my pupils, seeing his operations and seeing his results, wrote to him after leaving: "Intracapsular extraction of cataract is destined to be the operation of election. I can see that the time is coming when extraction of cataract will become a specialty within the specialty of ophthalmology, and that it will be limited to a few men."

REPORT OF THE PROCEEDINGS OF THE SECTION ON OPHTHALMOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. MARTIN COHEN, Secretary.

MEETING HELD MAY 16, 1912.

Dr. GEORGE E. DE SCHWEINITZ, of Philadelphia, presented by invitation a paper, **Concerning the relationship of so-called gastro-intestinal auto-intoxication to certain ocular disorders, notably of the uveal tract.**

During the last few years, Dr. de Schweinitz, as well as some other investigators, has endeavored to bring certain ocular diseases, notably those of the uveal tract, the episclera, and perhaps the cornea, into relationship with auto-intoxication of the intestines, with a view of clearing up their etiology in cases where the same was doubtful.

Having critically reviewed some of the recent literature on the subject, the author summarized the factors which justify the diagnosis of gastro-intestinal auto-intoxication, based upon the analyses of the urine, feces, and stomach contents of 23 patients. These examinations included particularly the determination of the quality and character of the urine, its quantitative analysis, the percentage of ammonia nitrogen to the total nitrogen, the fatty acids, the percentage of the conjugate sulphates to the total sulphates, and the presence of acetone, urobilin, phenol, and indican. Most of the analyses had been made by Dr. Edwin Goodman.

The presence of indicanuria alone must not be taken as the index of an auto-intoxication emanating from the gastro-intestinal tract, as this would be practically valueless in the absence of other findings. There was no known disease of the eye which of itself would justify the inference of intestinal

auto-intoxication being present. The clinical picture of ocular diseases, of the uveal tract for instance, might be identical, although their etiology might be widely different. Nor has laboratory examination isolated a definite toxin, to which any of the ocular diseases mentioned could be attributed, but it would certainly be worth while to make a close study of such patients, especially when the usual etiological factors, syphilis, tuberculosis, etc., were absent.

The reason why many clinicians look askance at auto-intoxication was, in Dr. Goodman's terms, the loose and inconsequential manner in which the term had been applied and in which the diagnosis was made. Infection, resorption of the products of triptogenetic infection, absorption of alimentary poisons, were not to be considered as an auto-intoxication. But the exhaustive analyses to which his patients had been subjected put us into possession of the evidence of intestinal putrefaction, enabling us to make strictly scientific regulations in diet. The favorable influence of the latter had been proved many times, when in his 23 cases the usual remedies alone had proved indifferent. Certain affections of the uveal tract and cornea should be sharply separated from perfunctory examinations and equally perfunctory and inefficient therapeutic measures.

Although no one has yet been able to prove that auto-intoxication of the gastro-intestinal tract was directly responsible, for instance, for uveitis as is the toxin of syphilis or tuberculosis, the author cannot believe that it is entirely without influence or that the restoration of a deranged metabolism is without its good influence from the therapeutic standpoint. Many of these diseases, particularly uveitis and iridocyclitis, are distinctly relapsing in character, and it is just possible that in some way auto-intoxication may be a determining factor in the relapse. When the strict dietetic régime was dropped, as it was by a patient with sclero-keratitis, a sharp relapse ensued. When the analyses indicated a return to normal conditions, the relapse subsided under dietetic treatment and as long as the patient strictly adhered to the prescribed diet. Again, as long as there is no return of the symptoms which are supposed to indicate auto-intoxication, no relapse occurs. Unfortunately, this theory had not held

good in all cases, which showed how much careful attention must be given to this subject and how it is possible to narrow down a small but none-the-less definite group of disorders which in some way depend upon an autotoxic state enterogenous in origin.

This method should, therefore, be especially employed when the causative factor is doubtful. As soon as the presence of auto-intoxication had been apparently proved by the author's exact chemical examinations, then something had been found that required removal, and with this removal a point had been gained in therapeusis which it was the right of patients to receive.

Discussion: Dr. EDWIN GOODMAN confirmed Dr. de Schweinitz's remarks on the question of analyses, adding that they placed absolutely no importance on the presence or absence of indican in the urine. He had found it present when auto-intoxication could be excluded and he had repeatedly failed to detect it when other urinary findings definitely pointed to that condition. Observers who based their opinion on a single body, laid themselves open to no uncertain criticism. It was not enough to examine only a portion of the daily urine, but the entire amount of the twenty-four hours should be collected and a test made with a portion of this. The indican test was made as part of the routine examination, but he disclaimed any faith in it. It was still a question whether Dr. de Schweinitz had found *the* causal relation between auto-intoxication and certain diseases of the uveal tract, but he certainly had found *a* significant association. Evidence of an association between auto-intoxication and the eye changes under discussion was offered by the marked improvement which followed treatment directed toward the auto-intoxication.

Dr. JAMES EWING: It is the great function of the clinician to pick out, from a broad survey of the clinical field, those forms of disease which are related, and to point the way toward the solution of their etiology. From the group of continued fevers, abdominal typhus was segregated by clinical observation and in due time its etiological agent was demonstrated. In thus defining a group of ocular diseases which he believes to be of autotoxic origin, Dr. de Schweinitz has rendered a notable service to medicine.

Whether these diseases will eventually be proven to be due wholly to intestinal auto-intoxication must be determined by future studies, but from the general rule governing autotoxic diseases this result would appear improbable.

In the etiology of most autotoxic diseases there is an important element of personal or tissue predisposition. For example in pernicious anæmia, it is the congenital or acquired weakness of the blood-forming function which renders the subject susceptible to the development of pernicious anæmia when the autotoxic factor makes its appearance. It would appear likely that ocular diseases are no exception to this general rule. Moreover there are several forms of auto-intoxication besides the gastro-intestinal, some of which involve functional disorders of such organs as the liver, kidneys, or thyroid gland, all of which may play a part in ocular diseases.

Regarding the value of the data which Dr. de Schweinitz presents, I think he is too modest in their estimation, for the chemical analyses and results of treatment seem to strongly favor the autotoxic theory. It is very difficult to secure decisive data in these chronic autotoxic conditions, since the disturbances may be intermittent and the clinical effects may be observed long after the disappearance of chemical signs of disorder.

Most assuredly it is worth while to pursue such studies as Dr. de Schweinitz has long conducted. The situation in this field is similar to that in many others where the problems formulated by the clinicians lie at the door of the physiological chemist and urgently demand the fullest support of the interests of chemical pathology in our university laboratories.

Dr. H. C. FLEMING: The charts exhibited are intended to illustrate the extreme variation of the quantities of indican in the urine of a given case, not only on different days, but also at different hours on the same day.

It is not our intention to discuss the pathological or clinical significance of indicanuria, but simply to point out the fallacious conclusions which may result from making the diagnosis upon anything short of a series of urinalyses, as is, at times, done by the general practitioner.

Our conclusions are drawn from the results of 1860 urinalyses made chiefly upon convalescents at the Roosevelt Hospital.

The patients were taking exercise and their diet consisted of the usual hospital one of moderate protein intake (80–100 grammes).

The following method was employed in carrying out these investigations. The urine was collected at 6 A.M., noon, 6 P.M., and 10 P.M., the specific gravity of each specimen determined, and $\frac{1}{25}$ of the volume used. After filtration with basic lead acetate the test for indican was made with Obermayer's reagent. The strength of the reaction was estimated by comparing the resulting color with that of Fehling's solution as a standard, as recommended by Folin.

TOTAL NUMBER OF TESTS MADE, 1860.

Hours.	Strong.	Moderate.	Faint.	Total.
6 A.M.	146	112	300	558
Noon	144	96	260	500
6 P.M.	56	63	388	507
10 P.M.	78	46	171	295
Total	424	317	1119	1860

Hours	Percentage of Strong to Total Strong.	Percentage of Moderate.	Percentage of Faint.
6 A.M.	34.47	35.33	26.81
Noon	33.99	30.28	23.23
6 P.M.	13.21	19.89	34.67
10 P.M.	18.33	14.50	15.29
Total	100.00	100.00	100.00

Dr. LEWIS A. CONNER has long been convinced that excess of indican in the urine could not be used as a trustworthy index of intestinal auto-intoxication. In view of the widespread popular belief in it as such an index, it was very important that this fact had been emphasized. The cases of obscure affection which did not show indications of serious intestinal disturbance might be due to the steadily growing group of conditions, especially affections of the joints, which seemed to owe their origin to some remote and often apparently insignificant focus of infection.

Dr. ARNOLD KNAPP stated he had given special attention to this class of cases and had had, through Dr. Ewing's courtesy, the advantage of a complete chemical examination of the urine in the Cornell Laboratory. But with few exceptions the urinary findings did not throw any light on the condition. He was convinced, however, that this relationship existed in certain cases.

Dr. EMIL GRUENING said that Dr. de Schweinitz was making good use of his unusual facilities of having the Laboratory of Physiological Chemistry of the University of Pennsylvania at his disposal; and, if he had not yet demonstrated the relation of auto-intoxication to certain ocular diseases, it was due to the difficulties of solving so intricate a problem.

His criticism of other authors who based their reasoning on the presence of indican in the urine, was justified. If in a given case of iridocyclitis, the most frequent etiological factors, tuberculosis and syphilis, could be excluded, there was still a considerable multitude of causative probabilities before the vague conjecture of the existence of intestinal auto-intoxication was justified.

Dr. COLMAN WARD CUTLER narrated the case of a colored man, aged 28, with an acute uveitis. With indifferent treatment he improved rapidly and in a month it was possible to see the exudate and œdema in various parts of the retina, with two patches resembling the so-called plastic choroiditis.

Examination of the urine had been negative, with the exception of excessive indican. When first seen, there were three small suppurating foci of the lower lid of the affected eye. Without the most careful examination it would be impossible to say whether this was an infection or an intoxication. In some less acute cases the source of the affection seemed to be more irritative than inflammatory, and it would be interesting if Dr. de Schweinitz could offer some suggestion for classifying the same.

With regard to etiology, anaphylaxis might be considered as a possible factor in intoxications.

Dr. WILBUR B. MARPLE stated that ever since Dr. de Schweinitz read his first paper on the subject nine years ago, he had treated all his cases of this nature on the supposition that an auto-intoxication was the important etiological factor,

with better results than formerly. But he had been greatly disappointed at the paucity of results of investigation in spite of the careful investigation by a competent colleague. Nevertheless, he felt that Dr. de Schweinitz was on the right track.

Dr. EDGAR S. THOMSON believed that in many cases of chorioiditis, auto-intoxication played an important part, as the cases cleared up more rapidly under treatment of the gastro-intestinal tract. He had the impression that many cases of rheumatic iritis as well as certain forms of episcleral inflammation are due to this cause and thought that the whole subject merited further consideration.

Dr. HAYES gave it as his opinion that abundant indicanuria *is* abnormal and one important indicator of intestinal putrefaction; and that gaseous distention of the bowels was an evidence of intestinal disturbance too little regarded. He had seen a number of cases of eye trouble apparently entirely due to metabolic disturbances which had been relieved by correcting the intestinal indigestion.

Dr. P. A. KOBER, of the Roosevelt Hospital Research Laboratory, believed that in auto-intoxication too much attention had been given to protein metabolism, and not enough importance to the possibility of this condition being due to disturbances in fat and carbohydrate metabolism. The similarity in structure between the alcohols—carbohydrate-like bodies—and the sugars was suggestive in this respect, because of the well-known toxic effect of wood alcohol upon the eye.

Dr. EDWIN GOODMAN added to his former remarks that the studies of Dr. de Schweinitz and himself had certainly been principally directed to protein metabolism, because it was the most convenient and, theoretically at least, the most important. Disturbances of fat metabolism and carbohydrate digestion were detected most easily by examination of the digesta, and this had been done in each instance. To test the rôle played by the liver in the etiology of these cases, the alimentary levulose test had been employed, and one case in which a positive levulose test was found had been excluded from this series. Many of these patients came from out of town, and owing to their short stay the examinations could not be made as thoroughly as in a research laboratory.

REPORT OF THE PROCEEDINGS OF THE BRITISH MEDICAL ASSOCIATION, SECTION OF OPHTHALMOLOGY.

By Mr. C. DEVEREUX MARSHALL.

LIVERPOOL MEETING, WEDNESDAY, JULY 24, 1912. EDGAR A. BROWNE, M.CH., F.R.C.S.E., PRESIDENT, IN THE CHAIR.

After the President had addressed a few words of welcome to the members present, Mr. George Coats opened a discussion on **chronic iridocyclitis.** He said there was a marked tendency to seek the cause of iridocyclitis in poisoning from septic teeth or the intestinal canal. The position was difficult to prove or disprove, and both pathological states were very common. That being so, why was iridocyclitis so, relatively, rare? Doubtless the particular resistance of the individual explained many exceptions. In recent years the presence of indican in the urine had been taken to prove the presence of intestinal putrefaction. Keratitis punctata was very commonly present, and was also associated with heterochromia and cataract, the affected iris being of the lighter color. Some thought it due to bleaching as the result of inflammation, or that it was an original condition of the patient, and indicated either a pure "lusus naturæ," or a congenitally abnormal eye with weaker resistance. His own view was that the loss of pigment was the effect of the iridocyclitis, even though the history might indicate that it was long antecedent to the origin of the disease. The origin of the disease was so slow and insidious that its early recognition was no matter of surprise. That the bleaching was the result of inflammation was further evidenced by its appearance in interstitial keratitis and chronic glaucoma. Next, he wished to speak of sympathetic ophthalmitis. Modern research established that the

disease was due to a living organism, either bacterium or protozoön, and that this organism reached the other eye not by the nerve or orbital sinus, but by the general circulation. This implied a specific affinity of the poison towards certain tissues. Recently, Elschnig attributed the disease to anaphylaxis, a reaction which had proved of grave import by the injection of repeated doses of foreign albumens into guinea-pigs. The suggestion was that with the breaking up and absorption of uveal pigment in the injured eye, a hypersensitiveness of the body generally, and especially of the other eye, was produced. Elschnig supposed that the condition could not become effective except in the presence of some constitutional anomaly, such as nephritis, diabetes, auto-intoxication, etc., or a minute lesion of the hypersensitive eye. Part of this could not be correct, as it occurred in healthy and robust people. In very mild cases he questioned whether there was pathological evidence of their being of the same nature. His own experience led him to believe that the most characteristic feature of all was the wide-spread infiltrations, usually of the whole uveal tract, and this was in marked contrast to the cases of severe iritis seen in other conditions.

Mr. A. W. Ormond (London) said he wished to consider the question of rheumatism and gout as etiological factors in iritis. We were as yet ignorant of the cause of either of these conditions, although there was evidence that a streptococcus was frequently present in the former disease. He thought that the connection between acute rheumatism and iritis was practically *nil*. At Guy's Hospital during ten years there had been 1163 cases of acute rheumatism with no iritis. In chronic or subacute rheumatism many other complicated features entered, probably of secondary infection, with which iritis might be associated. Occasionally one of these cases simulated acute rheumatism. Gout as a causative factor had even less to recommend it. Toxines could produce joint trouble, but he considered that *iritis* and *iridocyclitis* were due invariably to the presence of micro-organisms in the uveal tissues, and that these tissues were very susceptible to invasions by the spirochæta pallida, tubercle bacillus, gonococcus, etc. These tended to produce purulent inflammations of

lesser degree when organisms were deposited metastatically in the uvea from the blood stream.

Professor Snellen (Utrecht) said that there was a great difficulty in determining whether in any case of *iridocyclitis* the iritis or the cyclitis was primary. He discussed Fuchs's view that keratitis punctata indicated cyclitis. He thought that its presence resulted from chemotaxis drawing the cells into the anterior chamber and their deposition was due to gravity. He thought, also, that there was some toxine in the conjunctiva, which drew the cells into the anterior chamber.

Mr. Claud Worth (London) agreed that there was no sufficient evidence of the *existence of true rheumatic or gouty iritis*. In the cases with keratitis punctata the most important cause was chronic gastro-intestinal disturbance. He drew attention to some cases which might be mistaken for chronic glaucoma. The examination by the loupe was the only way in which they could be diagnosed.

Mr. J. Gray Clegg (Manchester) had seen a case of *sub-acute iridocyclitis* due to oral sepsis, which had cleared up, but a portion of the iris was becoming bleached. This was an answer to many enquiries as to the real cause of the loss of pigment; it was a symptom and the result of cyclitis. He also called attention to some cases seen in young women in whom unusually early symptoms of cataract had been found.

Mr. S. H. Browning (London) said that the best proof of the origin of many cases of *iridocyclitis* lay in the good effect of vaccine treatment. In cases he had seen, definite bacterial infections had been found in the teeth, gut, and bladder, and the vaccine treatment had been fruitful of success. On the other hand, it was extremely rare to find organisms in the aqueous. He had obtained no useful information as the result of examination of the urine for indican. The bacillus coli had been found in the urine several times, and in every case cure had resulted from vaccine treatment.

Mr. W. H. Brailey (Brighton) said he did not agree with Mr. Ormond that toxines could not cause iridocyclitis. He thought that this was a very common factor in the conditions, although it was difficult to prove it.

Mr. T. Harrison Butler (Coventry) drew attention to certain anomalies which were difficult of explanation. In

Palestine, oral sepsis of the worst kind was almost universal, but iridocyclitis was extremely rare. Rheumatic iritis he regarded as a myth. Many of the supposed cases were due to septic and tubercular infection. That a toxine could produce iridocyclitis he had no doubt; how else could the unfortunate cases following the instillation of tuberculin in the Calmette reaction be explained? Or how did a corneal ulcer produce a hypopyon iritis? He did not think that malaria could produce it, nor could chronic suppuration do it alone.

Dr. GEORGE MACKAY (Edinburgh) said the absence of organisms in the anterior chamber was very good evidence that these cases must be due to toxines. He cited cases due to the bacillus coli which had been successfully treated.

Mr. BISHOP HARMAN (London) said much had been made of the apparently successful production of iritis in animals by the injection of streptococci of rheumatic origin. He had seen some of these cases, and his inclination was to consider the iritis as more of a pyæmic condition than akin to any iritis common to man. The association of septic conditions of the mouth and gut was very common with iridocyclitis, but these septic conditions were so exceedingly common that the association might seem to be fortuitous, especially as too frequently the direct treatment of the sepsis did not relieve the condition. But in the allied condition of bacilluria the results of treatment, either with urinary antiseptics or with vaccines, were so striking, that one could not hesitate to accept the theory that auto-intoxication could account for iridocyclitis. Too much elaboration had, he thought, been shown by Professors Fuchs and Snellen in their explanations of the peculiar distribution of the precipitates on the back of the cornea. He thought simple physical phenomena gave the true explanation; in inflammation of the ciliary body the aqueous was turbid. On secretion, with the normal flow into the anterior chamber, the silt found its natural level, and its aggregation into clumps was again partly a physical phenomenon that could be observed in inert precipitates. He thought the supposition that these were toxines in the superficial tissues was quite unnecessary. The theory of anaphylaxis had something to commend it to our attention as a possible explanation of the symptoms of sympathetic ophthalmitis.

It might conceivably be the primary condition that rendered the sympathizing eye so susceptible to the attack of the real agent. It was particularly suggestive in those cases of violent sympathetic disease which followed rupture of one eye without apparent injury to the conjunctiva.

Dr. J. IGERSHEIMER (Halle) agreed that indigestion was possibly a cause of iridocyclitis, even though it could not be definitely proved. The production of cataract by naphthol poisoning in the animal was interesting in this connection; it only followed ingestion of the poison into the stomach, and not injection into the veins.

Dr. MAITLAND RAMSEY (Glasgow) said that defective elimination was frequently associated with persistent iridocyclitis, in which careful examination excluded all evidence of bacterial infection. Treatment directed to the increase of the quantity had been successful in that there was a subsidence of the ocular inflammation.

Mr. COATS replied.

Dr. KARL GROSSMANN (Liverpool) read a paper on the **Board of Trade standard of eyesight tests for sailors.**

As regards form vision he advocated the adoption of a stringent test, but when the failure to pass was due to an error of refraction remediable by glasses, he thought that glasses should be allowed. They were serviceable to sailors, engine-drivers, chauffeurs, etc., and the prohibition of their use was an old and foolish notion. Commenting on the color tests, he considered that the lantern test was the only efficient one, but recommended that the colors should not be named, but only matched. He thought it necessary that A. B.'s should be periodically re-tested, and their vision noted in their papers, so that captains would know whom to employ as look-outs.

Mr. J. W. BARRETT (Melbourne) said that in Australia the Board of Trade tests were considered so utterly inadequate that the principal steamship companies entirely rejected them as useless. For the pilot service, the candidates were completely examined by ophthalmic surgeons, and unless they had good eyesight, they were rejected. They would not pass a candidate, no matter how good his vision was, if he had more than about 2 D. of hypermetropia, as his distant vision would

fail later on. Holmgren's test was next door to useless, and he mentioned the case of the loss of the P. and O. steamship "Australia" at Port Philip, which was due to the pilot who had only $\frac{6}{36}$ vision, and also had previously lost a ship because he had failed to see an occulting gas buoy, as a "flock of birds" was said to have come in the way. He thought that unless candidates were examined by careful examiners instead of by clerks and marine officers, who knew nothing of the subject, no satisfactory results could be obtained.

Mr. DEVEREUX MARSHALL (London), commenting on the recent Report of the Departmental Committee of the Board of Trade, said that the Report was most disappointing. He criticised the action of the Committee in introducing a lantern, instead of reporting on those existing and well-known. Further, their lantern was, on their own showing, inefficient, and had been simplified so that it should not confuse the lay examiner; consequently it no longer presented difficulties to most color-blind candidates. He considered that if this lantern were used it was bound to prove that "lanterns" were useless. Lastly, the Committee had supported the Holmgren test against the considered rejection of almost every other authority.

Mr. T. H. BICKERTON (Liverpool) said he was in entire agreement with Mr. Marshall in his criticisms of the Board of Trade Report. That document showed an entire ignorance of the conditions of the seamen.

Mr. BISHOP HARMAN (London) severely criticised Dr. Grossmann's recommendation as to the wearing of spectacles by sailors. He said it was evident that either Dr. Grossmann had not worn glasses at sea, or else that he was unfamiliar with the sea. His experience of spectacles at sea, over many years and under conditions ranging from fishing smacks to the bridges of large steamers, was that spectacles were worse than useless. They speedily became covered with fine drops of spindrift, so that vision through the lens was much worse than without any glass at all. Spectacles were a boon in their proper place and in reasonable conditions, but outside the cabin of a steamship they were an impossibility.

Mr. HARRISON BUTLER (Coventry) confirmed the experience of Mr. Harman, and also said that a very little reduction of

form vision rendered one incapable of picking up marks at sea.

Mr. C. H. SHEARS (Liverpool) and Dr. GEORGE MACKAY (Edinburgh) discussed the actual standard of form vision recommended.

Dr. GROSSMANN replied.

LIVERPOOL MEETING, THURSDAY, JULY 25, 1912. EDGAR A. BROWNE, M.CH., F.R.C.S.E., PRESIDENT, IN THE CHAIR.

In opening the discussion on the **use of tuberculin in diseases of the eye,** Dr. GEORGE MACKAY (Edinburgh) gave a brief résumé of the specific modes in which tuberculin might be employed in diagnosis and treatment. He explained how, prior to Calmette's ophthalmic test and von Pirquet's cutaneous reaction, he had found much help from the study of phagocytic indices as first suggested by Wright, but modified by Dr. Ian Stewart and Peel Ritchie of Edinburgh, and that he still availed himself of this method of diagnosing in complex cases. With the aid of the epidiascope, a large number of beautifully drawn colored illustrations were exhibited, depicting eyes affected with phlyctenular conjunctivitis, episcleritis, keratitis, kerato-iritis, iritis, iridocyclitis, interstitial keratitis, and pseudoglioma. Attention was drawn to the importance of recognizing the association of staphylococcic infection, especially with more superficial tubercular lesions; of the value of tuberculin in the diagnosis of specific and tubercular interstitial keratitis, or rheumatic and tubercular episcleritis, in the recognition of tubercular paralyses of oculomotor nerves, and in the treatment of these conditions when of tubercular origin and when due to mixed infections. Some illustrations of its use in showing tubercle as a causative factor in cases of doubtful origin were also submitted.

Dr. L. C. PEEL RITCHIE (Edinburgh) dealt with the methods of blood examination employed in the investigation of cases like those shown by Dr. Mackay. They had to remember that while the blood might give evidence of the presence of some particular organism affecting the system, that in itself did not furnish the cause of the eye infection. Further, there was a possibility of more than one variety of infecting agent being present. At first they had to make a large number of

blood examinations for a variety of organisms, but with experience the range of the examinations became limited, and latterly some inoculation tests and treatment had been carried out in a number of patients without any examination of the blood. He showed that this differentiation of the various types of tubercle was of great importance. In some, the bovine tubercle was specially common, and treatment with human tubercle was ineffective. The general principle was to keep the patient constantly under the influence of small doses, of fairly uniform amount of tuberculin, to avoid hypersensibility by giving the earlier doses at short intervals, while later, as the condition tended to come under control, to increase the intervals, and also the dose.

Dr. HILL GRIFFITH (Manchester) gave an illustration of the successful use of diagnostic methods and treatment with tuberculin in two recent cases. One was an adult man suffering from tubercular conjunctivitis, and the other a boy with multiple tubercular lesions. Injections of tuberculin T. R. at intervals of fourteen days had been most successful.

Mr. T. HARRISON BUTLER (Coventry) said that Calmette's reaction was dangerous and inaccurate. He had seen violent reaction, with interstitial keratitis and corneal ulcers developing in perfectly normal eyes after its use. Von Pirquet's reaction was positive in 90% of all adults, and so became valueless. In children it was more useful. Injection of Koch's old tuberculin was the only method which gave good results in ophthalmic work. A local reaction was almost certain proof of ocular tuberculosis. He had used .001g, followed, after a few days' interval, by .002 and .004. He had had a case which failed to react to human, but reacted to bovine tuberculin. For treatment, T. R. $\frac{1}{2000}mg$ was the best. He used this for months. It was questionable if good results could be obtained by increasing this dose. He had seen excellent results in tubercle of the uvea. Scleritis and sclerosing keratitis were frequently tubercular, and often cured by tuberculin. Dr. Hill Griffith's case might be one of Parinaud's conjunctivitis, which had, in many cases, been proved to be tubercular.

Dr. W. B. MARPLE (New York) said that he was much interested in the cases of interstitial keratitis of tubercular

origin. In his own experience the majority of cases of interstitial keratitis gave the Wassermann reaction, and the balance did not react positively to the tuberculin test. He had had several obsolescent cases of tubercular choroiditis with a focus of recrudescence with positive tuberculin reaction. Some cases of recent tubercular choroiditis with "mutton-fat" exudation on Descemet's membrane quickly disappeared, but the opacities in the media and the choroiditis only very slowly got well. In tubercular iritis, where tuberculin was given as a diagnostic aid three times at intervals of four days, no positive reaction, except a very slight rise of temperature, was noted, but the nodules gradually disappeared. He agreed that small and gradually increasing doses were necessary, and that the treatment should be continued for several months, or a year.

Dr. Louis Dor (Lyons) said that no doubt some remembered the enthusiasm of the whole assembly when, in 1890, at the International Congress at Berlin, Koch announced that he had found a remedy for tuberculosis which he called tuberculin. From then till 1893 nearly all physicians tried it, but, unhappily, it was proved that the remedy was very dangerous, and that in some cases the disease was aggravated. Lately he had treated a great number of patients with interstitial keratitis, 80 in four years. He considered that a great number of cases of interstitial keratitis where the Wassermann reaction was negative, cases of phlyctenular conjunctivitis, chronic scleritis, quiet iritis, hyalitis, detachment of the retina without myopia, iridocyclitis, optic neuritis, etc., were due to tubercle, and in these the best thing was to try the action of tuberculin as a diagnostic agent. In the majority of cases, local and general reaction resulted, and many of them were very atypical cases. He used very small doses (a one hundred thousandth part of a milligram), and every third day he injected a larger dose so long as no reaction resulted. As soon as a local or general reaction was apparent he injected the same dose until it produced no reaction, then he again increased the dose. He did not neglect local and general treatment as well. He had never seen bad results from this method, which had a very beneficial effect on the lesion. The action was slow, and quite unlike the rapid action of salvarsan and iodide.

It was absolutely necessary to treat a great number of patients before coming to a definite conclusion. The treatment should never be shorter than two months. Even after three months, when the patient seemed to have been cured, he had seen a relapse. Then a second course of treatment was necessary, as long as the first. He was thoroughly convinced of the beneficial results of tuberculin. For the majority of cases he preferred the German bacillary emulsion (B.E.), which was a culture of bacilli crushed and killed.

Mr. BISHOP HARMAN (London) wished to raise the question as to whether they were justified, in the present state of knowledge, in using tuberculin by rule-of-thumb methods, that is, without a preliminary exhaustive examination of the blood, and the repetition of these tests during each stage of the treatment. He thought they were justified in doing so. The cutaneous tests for tubercle were at best dubious, and the personal equation in making the blood tests was so great that in any event they were left mainly to their own clinical acumen. He had found the use of tuberculin in selected cases, after the manner detailed by Dr. Peel Ritchie, safe and satisfactory. And he relied upon three guiding signs: the appearance of the local lesion, the temperature of the patient taken regularly, and, lastly, the feeling of fitness on the part of the patient. If the patient felt out of sorts, no injection was given that day. With regard to the assumption on the part of some that phlyctenular conjunctivitis was always of tubercular or para-tubercular origin, he would raise the most emphatic protest against such a sweeping assertion. All the evidence tended to show that the greater number of the cases—which formed a large part of those seen at children's hospitals—were comparatively innocuous lesions due to local causes. He had examined the case-papers at the Belgrave Hospital for ten years, with these results. Of all the cases, one half were cured in one week; a further quarter in a fortnight, and only 5 per cent. dragged on for a month, and these were cases of phlyctenular keratitis occurring in children who were justly called "strumous" at sight. Next, the cure was obtained by the simplest means, such as yellow ointment. In some cases he had experimented with plain castor oil, with equally satisfactory results. Further, the cases had an "age peak".

at six years old, a fact which had no relation to tubercle, but a very definite one to the decay of the first dentition and the eruption of the second teeth. Lastly the lesions had a seat of election, one that had a specific relation to the distribution of the fifth nerve to the supply to the teeth. These things led him to conclude that the common phlyctenular conjunctivitis of children was not tubercular in any real sense, it was a herpetiform eruption due to irritation of collateral branches of the fifth nerve. In a residuum of cases there were genuine tubercular lesions, particularly those lesions which occurred in later years of the pustular sort, and the combined episcleral and corneal lesions which were often, but probably erroneously, called "phlyctenular." He felt that to assign a simple lesion to a grave condition and to claim a cure for it by vaccine treatment, when it was more easily cured by the simplest means, was to discredit vaccine treatment.

Dr. MACKAY briefly replied.

The treatment of word-blindness, acquired and congenital: a paper read by Dr. JAMES HINSHELWOOD (Glasgow).

Dr. Hinshelwood said the old idea was that nothing could be done for the education of persons suffering from these serious defects. Much, however, could be done if the treatment were conducted on proper lines, and he indicated what line, in his experience, it was best to adopt. Pure cases of acquired word-blindness almost always came to the ophthalmic surgeon in the first instance, as it was supposed the defect lay in the eyes. The lesion, however, was in the brain, either in the angular gyrus, or in the interruption of the communicating fibres between it and the cortex. In right-handed people the lesion was on the left side. He related the case of a man, æt. 58, a teacher of languages, who awoke one morning with the power of reading quite lost. He had right lateral homonymous hemianopsia, but no other symptoms were discoverable. He started to re-educate himself, learning words and letters like a child. After six months he was able to recognize the letters of the alphabet, but never learned to read words by sight. He could read only by spelling out words letter by letter, and thus appealing to his auditory memory. After a year he gave it up as hopeless. Still, he had re-acquired the visual memory of the letters and of a few

short words. Another patient was a woman, æt. 34, who had been completely word- and letter-blind for fourteen months. She had right homonymous hemianopsia. Her brother, who was a schoolmaster, took great interest in her re-education. It was found that the effort of education was very great, and could not be continued for more than ten minutes at a time. Ultimately, she learned to read simple Bible texts by spelling out the words. Her progress from that point of attainment has been steady but slow. After an interval of ten years she could read a newspaper fairly fluently; only occasionally was she compelled to spell words. The third case was that of a girl, æt. 14 years, who had right-sided paralysis and loss of speech eighteen months before. Previously she had been a good reader. When first seen she was completely letter-blind, and had right homonymous hemianopsia. The auditory memory was unaffected. Re-education was started. After learning the alphabet, she was allowed to spell out the words letter by letter. In four months she had made considerable progress, and could recognize any letter, and many small words. Longer words she had to spell, so as to get the aid of her ear. Two years later she could read as well as ever, but the hemianopsia persisted. Age evidently was a very important factor in the ability with which these patients were able to regain their lost powers. The lesion in these cases was cerebral hemorrhage. In such cases the process of re-education should be delayed until all signs of acute brain symptoms had disappeared. Re-education in these cases could be accomplished only by bringing into play the corresponding centre on the other side of the brain. He argued that both in these and in congenital cases neither the old system nor that known as the "look and say" method was suitable for all cases. A great deal would depend upon the degree of defect in the visual memory and upon the condition of the auditory memory. When the visual memory was very defective and the auditory good, then the old system would give the best results: but when the auditory was not good, the best results might be obtained by the "look and say" system. Lastly, personal education was in all cases necessary, and a number of short reading lessons during the day were better than one long one, for the brain rapidly became exhausted.

Dr. F. W. EDRIDGE GREEN (London) quite agreed with the methods suggested for training the memory. He considered it was of the greatest importance to put as little strain as possible on a weak faculty. It should be remembered that the retina was represented in the cerebrum, and we might almost speak of a "cerebral retina."

LIVERPOOL MEETING, FRIDAY, JULY 26, 1912. EDGAR A. BROWNE, M.CH., F.R.C.S.E., PRESIDENT, IN THE CHAIR.

A discussion on the **use of salvarsan in diseases of the eye** was opened by Mr. SYDNEY STEPHENSON (London).

Mr. Stephenson said that most were agreed that the best mode of administering the drug was by intravenous injection. As regards dosage their aim was not so much to relieve the local symptoms but to cure the underlying disorder. At least two or three maximum doses should be administered at intervals of a few days. Some of the poor results obtained by the drug were really due to inadequate dosage. Some had held that small doses resulted in the production of resistant strains of spirochætes. The use of the drug must go hand in hand with the frequent determination of the Wassermann reaction, and it was important that the test should be quantitive as well as qualitative. It had been shown that the administration of salvarsan did not prevent the appearance of new syphilitic symptoms during the period of administrations just as was the case with mercury; this recurrence was attributable to the presence of nests of organisms which escaped the action of the initial doses. Experience showed that tertiary symptoms appeared earlier after the use of the drug than under ordinary treatment, and to some extent it could be said the type of syphilis was altered by the new treatment. These appearances were most frequent after the use of small doses of salvarsan and pointed to inefficient treatment. There was strong evidence to show that it was necessary to use mercury conjointly and after the injection of salvarsan with the object of preventing these late symptoms.

General symptoms seen after the injection of the drug, such as pyrexia, insomnia, sweating, nausea, headache, restlessness, and so forth, were probably more the effect of faulty administration than the direct effect of the salvarsan. In this con-

nection it was of the utmost importance that the solvent should be freshly distilled water.

In eye disease particularly it was of the first importance to prevent local reaction else the delicate tissue of the eye might be further damaged, and in this connection it was reported that such reactions were commoner when insufficient doses were employed. Recently it had been shown that salvarsan was contra-indicated in severe vascular lesions of the eye with tendency to hemorrhage. The influence of the drug upon the optic nerve was of the first importance to ophthalmic surgeons. Ehrlich had shown in his long list of collected cases only one case of nerve effect; other later workers had averred there was danger to the nerve, but the balance of opinion was distinctly in favor of its innocuous character as regards the healthy optic nerve, and also that it could safely and with real advantage be administered in syphilitic affection of the nerve. Ehrlich's observation was now two years old.

Considering ocular disease there was unanimity of opinion as to the curative effect of the new product; at most it appeared to give one more antisyphilitic remedy, the exact place of which remained as yet uncertain. In interstitial keratitis of inherited syphilis for which mercury was well-nigh useless, salvarsan had on the whole given no better results; a few surgeons reported good results, but the majority thought the malady little influenced by it. The relief of photophobia was fairly generally acknowledged. Those who claimed good results from its use were accustomed to give several injections

An interstitial keratitis of acquired syphilis was readily relieved by it, but the same speedy relief was to be obtained by mercury. As a rule, iridocyclitis of secondary syphilis responded well to the drug and much more quickly than it did to mercury. Improvement was usually found the day after the injection. In conclusion, it appeared that when properly given it presented no particular danger to the body nor to the eye; it was most likely to be useful in primary and secondary manifestations, particularly in conditions affecting the uveal tract, but it was well to combine its use with mercury.

Dr. J. IGERSHEIMER (Halle) gave an account of a series of important experiments he had performed upon small

mammals to determine the toxicity of the drug. In the optic-nerve fibres of cats, there was definite reaction of degeneration by Marchi's method after its use, but the degeneration only followed chronic poisoning. He agreed that there was no evidence of such untoward effects in man. In recent syphilitic affections of the optic nerve salvarsan had a very favorable effect. The drug was least useful in interstitial keratitis, but in his hands there had been distinct improvement in quite a number of cases when two or three injections were given; he did not mean cures, but a certain favorable influence on the course of the disease. Further in these inherited cases he found that salvarsan had more influence in varying the Wassermann reaction than had mercury. Beneficial results had been obtained in paralyses of ocular muscles of syphilitic origin, particularly in gross paralyses due to gumma of the orbit which pressed on the optic nerve. He had had some experience with neosalvarsan, a late product which had the distinct advantage of being easily soluble. Its toxic effect upon cats was greater than that found for salvarsan. He had injected it experimentally into the corneæ of rabbits; the clouding produced speedily cleared up. Subconjunctival injection however tended to produce necrosis. Used in syphilitic patients it appeared to cause some transient mental symptoms, but it exerted a distinctly more favorable influence upon interstitial keratitis than did salvarsan.

Dr. W. B. MARPLE (New York) said he preferred to reserve his opinion of the value of the new drug until after the dust of premature observations was removed from the medical atmosphere. He had used salvarsan in interstitial keratitis and gummatous or papular ititis. In the keratitis, although the Wassermann reaction was negative, no effect was observed on the ocular condition except possibly a slight diminution of photophobia. In iritis the effect of the injection was extraordinary; it was more rapid and complete than could be obtained by other methods.

Dr. A. MAITLAND RAMSEY (Glasgow) said he had used salvarsan in 22 cases of eye disease due to syphilis. Two were chronic cases, five congenital, and the remainder acquired. Primary chancre of the eyelid responded to the treatment with remarkable rapidity, so also did syphilitic ulceration of the

conjunctiva. Scleritis showed no improvement, one case of kerato-iritis improved considerably. Five cases of iritis responded, one with magical rapidity. Five cases of choroiditis showed improvement, particularly when the lesion was recent.

As regards dangerous effects of the drug upon the optic nerve, he was inclined to think that cases reported were due to the continued activity of insufficiently treated syphilis rather than to the noxious influence of the drug. In conclusion he recommended the conjoint use of mercury and those local measures which one most approved.

Mr. S. H. BROWNING (London) dealt with the use of salvarsan in sympathetic ophthalmitis. Continued observations of the blood in cases of this disease had shown that there was a distinct increase in the number of large mononuclear leucocytes, even to 30 or 40% of the white cells. This was typical of the blood of patients suffering from protozoön infections. The deduction was that this fell disease might be due to such an infection and therefore be ameliorable to treatment by salvarsan. He detailed the case of a boy treated upon this hypothesis by three injections of salvarsan; the results were excellent and distinctly warranted the extended trial of the drug for this intractable disease.

Mr. BISHOP HARMAN (London) said he was in the fortunate position of being able to overlook the work of his colleagues in a general hospital where salvarsan had been extensively used. It was their custom to prepare the patient as for a major operation, to give an average dose in two or three injections at intervals of a week.

So far he had not seen any deleterious effects upon the optic nerve, and in some cases he had watched it was used for cerebral syphilis with optic neuritis and they had benefited considerably, but in one there had been a sharp relapse. Among eye diseases, he had not been able to find any advantage in its use in interstitial keratitis even when used in three injections in a most recent and acutely vascular case. Again it had failed in rapidly advancing choroido-retinitis, but so also had mercury. He acknowledged its successful influence in acute iritis, but he did not advise it in such single ocular conditions which were readily ameliorable to other and completely

harmless measures. The case was of course different where other and general symptoms of the disease existed. In acute cyclitis with rapidly increasing vitreous opacities and in syphilitic optic neuritis its use was warranted, for rapidity of treatment was essential. In cases of lesser severity it should be given only when the risks had been fully explained to the patient, for there were risks. He had seen serious ocular paralyses follow immediately on the injection, and there were known cases of inexplicable and sudden fatal results even when the administration was in perfectly competent hands.

Dr. NIMMO WALKER (Liverpool) said he had also observed the use of the drug by his surgical colleagues and watched four cases of unsatisfactory results following its use. In one case, interstitial keratitis, and in another, gummatous iritis occurred after the injections, showing that they had been unsuccessful. In the two others, a papillitis and an acute retrobulbar neuritis with myelomalacia had followed the injections, but it was possible these effects were due to the syphilis rather than the drug.

Dr. INGLIS POLLOCK (Glasgow) said he would like to add a word of caution. It was within their memory that the disastrous effects of other arsenical compounds upon the optic nerves had not been observed until these drugs had been in use for some time. It was two years before the first of these cases had been noted, and in a short time two hundred had been put on record.

Dr. A. L. WHITEHEAD (Leeds) sent a summary of the cases related by him: interstitial keratitis, 37; syphilitic iritis, 22; retinitis, 1. The Wassermann reaction was positive in all. In acute iritis the results were striking and gratifying, so also in retinitis. In interstitial keratitis only two showed any detectable improvement; in three monocular cases the other eye became affected after its use.

Mr. JAMESON EVANS (Birmingham) said he had used salvarsan in a few cases with good results, including one of interstitial keratitis with marked photophobia and trigeminal neuralgia which had resisted other treatment. He had found general disturbance was not absent after the injection of neosalvarsan even when administered in the most exact manner.

Dr. A. POCKLEY (Sydney, N. S. W.) detailed a case showing the extraordinary rapidity with which gross and complicated iritis due to an accidentally acquired syphilis in a colleague had been reduced by the injection of this drug, yet death followed later from other syphilitic symptoms. He had found no benefit from its use in interstitial keratitis. No ill effects had followed its use in his patients, but in a neighboring hospital a patient had died suddenly after an injection.

Mr. SYDNEY STEPHENSON in reply urged that no evidence had been forthcoming that salvarsan had any deleterious effect upon the optic nerve, and insisted that it was unjustifiable to condemn it as useless in interstitial keratitis after the failure of single injections.

Dr. INGLIS POLLOCK (Glasgow) read a paper on **intraocular hemorrhage.** He said that retinal hemorrhage such as occurred in vascular disease was dangerous to vision only when it occurred at the macula; even then there was a possibility of absorption. Post-operative hemorrhage was particularly lamentable; it always occurred in the choroid, and such eyes were a total loss, and little could be done to anticipate such accidents. Certain recurrent hyaloid hemorrhages were common in young people, especially males, though some appeared in females as vicarious menstruation. Constipation and gout were predisposing factors. It was probable that such hemorrhages came from the veins.

Mr. CLAUD WORTH (London) said that he had recently seen a case of hyaloid hemorrhage recurring as vicarious menstruation in a young lady where treatment had been of no avail; the patient had ultimately become blind. In another lady the attacks had been stopped by the regular use of iodide of potassium.

Mr. H. EALES (Birmingham) mentioned a singular case occurring in a patient who had been brought up as a female but who proved at adolescence to be a male. The hemorrhages were most frequent in young males of from 15 to 25 years of age, and appeared to be due to a peculiar vasomotor condition. In some there had been concurrent tubercular disease.

Dr. J. GRAY CLEGG (Manchester) had had several such cases. The coagulability of the blood had been investigated

where there was no evidence of tubercle; in one there was evidence that it was below normal and calcium lactate had been of service.

Dr. IGERSHEIMER (Halle) said tubercle was a distinct etiological factor in these cases and the use of tuberculin had been valuable in one such case.

Mr. A. A. BRADBURNE (Manchester) gave an account of an investigation he had made into the relation of **ocular imbalance and auditory affections.**

Hunter, Fleurens, and Purkinje had noticed ocular effects in disturbance of the semicircular canals, facts that were established by Goltz. Later it was shown that these disturbances were due to excitation of the semicircular canals. Body balance was so intimately connected with binocular vision and the sensations of the auditory canals that it was not unreasonable to anticipate ocular symptoms in disease of these canals. He had investigated seven cases of labyrinthine disease, and all but two showed that the vertical meridians of one or both eyes tended to lean outwards at the upper end. In these two exceptions the proof of the ear disease was not complete. In cases of temporo-sphenoidal abscess there had been found a disturbance of the horizontal levels of the eyes. In a number of post-operative cases of ear disease he found similar defects; the vertical meridians were at fault in six, and the elevation in five. Allowing for the possibility of ocular imbalance being a condition existing before the ear disease in some, yet the frequency of the finding of eye defect seemed to point to a causal connection.

Mr. CLAUD WORTH (London) and Dr. HILL GRIFFITH (Manchester) discussed conditions allied to those noted by the author, and Dr. CHAS. GEORGE LEE (Liverpool) suggested that the visual influences in the production of sea-sickness had connection with the phenomenon noted by Mr. Bradburne.

Mr. JAMESON EVANS (Birmingham) gave a demonstration of the "Optophone," an instrument devised by Mr. D'Albe of Birmingham which had the property of rendering light radiations audible to the ear. The instrument was a selenium photometer. The sensitive plate was set in the circuit of an electric battery so that variations in the condition of the plate by light varied the current and caused it to work a ratchet.

The rate and strength of the sound indicated variations in the light which could be appreciated by blind people. At present he said it was a toy, but it had possibilities.

At the Liverpool Eye and Ear Infirmary clinical cases were shown by Dr. EDGAR STEVENSON, and at the St. Paul's Eye Hospital Mr. BISHOP HARMAN gave a demonstration of his new operation of **subconjunctival reefing and advancement** for squint; and Dr. NIMMO WALKER of the operation of kerotomy as practised there for corneal ulcers.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE THIRD AND FOURTH QUARTERS OF THE YEAR 1911.

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Edited and Translated by Dr. MATTHIAS LANCKTON FOSTER.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE. Reviewed by Dr. HOEHMANN.

1. **PETERS, A. The importance of the study of heredity in ophthalmology. Halle-a-S., C. Marhold, 1911.**

PETERS (1, **The importance of the study of heredity in ophthalmology**) takes the ground that the study of heredity must be considered of much greater importance in ophthalmology than has hitherto been the case. He gives a brief review of ophthalmic conditions in which his study has cast light in the past and in which more can be expected from it. For example, he speaks of malformations, hereditary atrophy of the optic nerve, various forms of cataract, such as the lamellar, total, and presenile, concomitant strabismus, congenital amblyopia, and the hereditary anomalies of refraction. The cause of all these pathological phenomena is to be found, he thinks, in a variation of the germ plasma. Thus in lamellar cataract the fibres that go to the formation of the central portion of the lens may be fœtally "stamped with the impression of inferiority," the monolateral amblyopia of hereditary

strabismus may be "the result of an inferiority of the macular area, usually combined with an anomaly of refraction, which in turn may be due to a variation of the germ plasm of hereditary origin." The report given of the result of the investigations of Barrington and Pearson is interesting, that "neither school life nor any other influence save only heredity must be considered to be the cause of myopia." Ophthalmology must take into account this not impossible conception on the basis of modern statistics.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND TREATMENT.

Reviewed by Dr. HOEHMANN.

2. WESSELY, K. **Anaphylactic phenomena in the cornea.** *Münchener med. Wochenschrift*, 1911, p. 1713.

3 and 4. HIRSCHBERG, J., and ABELSDORFF, G. **Fever in diseases of the eye.** *Zentralblatt f. Augenheilkunde*, July and Sept., 1911.

5. KOSTER and CATH. **Treatment of diseases of the eye with radium.** *Neederlandsche Tydschrift voor Geneeskunde*, 1911, 2, No. 8.

6. REISSERT. **Salvarsan and the eye.** *Deutsche med. Wochenschr.*, 1911, p. 1744.

7. MANZUTTO. **The effect of salvarsan upon some diseases of the eye.** *La Clinica Oculistica*, January and February, 1911, p. 475.

The fact that ulcera serpentia suddenly become enormously progressive a long time after infection has taken place, as well as the sudden abrupt appearance of a syphilitic parenchymatous keratitis, suggests that in these cases there is a periodic hypersensitiveness of the cornea. Based on this assumption, WESSELY (2, **Anaphylactic phenomena in the cornea**) instituted experiments on rabbits in which he injected serum from another species of animal into the cornea of one eye and two weeks later into the cornea of the other. The latter was immediately followed by a stormy reaction. When the injections were made only in the cornea of the one eye there was a severe reaction in the cornea and iris, but one less severe than in the first experiment. These experiments prove that a marked anaphylaxis can very easily be produced through the cornea, and that in the stage of hypersensitiveness the cornea reacts locally to the same antigen in the form of a parenchymatous keratitis.

HIRSCHBERG (3, **Fever in diseases of the eye**) finds that no fever accompanies ophthalmia neonatorum and gonorrhœal

ophthalmia of adults and is seldom present in panophthalmitis and iritis. ABELSDORFF (4) adds that fever is present in diphtheria of the conjunctiva.

KOSTER and CATH (5, **Treatment of diseases of the eye with radium**) report the results of treatment with radium of a large number of local diseases of the eye. The amount of radium bromide used was 5*mg*. The sittings were an hour or longer. No harmful after-effects were observed aside from a slight inflammation of the lid and conjunctiva. Very beautiful results were obtained in keratitis parenchymatosa, tuberculosa, and scrofulosa, in leucomas which were not chalky, and in irido-cyclitis, especially when tuberculous. Favorable effects were produced in different forms of chorioiditis. A slight improvement was noted in detachment of the retina not due to traumatism. The results were better in blepharo-conjunctivitis, tarsitis, nævus pigmentosus, xanthelasma, angiomas, verrucæ, ulcera rodentia and tuberculosa, and in a severe case of trigeminal neuralgia and tic convulsif.

B. P. VISSER.

REISSERT (6, **Salvarsan and the eye**) describes a case in which he thinks injury was produced by salvarsan. A young, healthy patient received 0.4 salvarsan immediately after a primary infection, and some weeks later 0.5 because of a cutaneous recurrence, both times subcutaneously. Several months later he began to suffer from pains in the head and face, and shortly afterward a neuritis of the right optic nerve appeared, together with a slight anisocoria. Three months later he had, in addition, retinitis with hemorrhages and marked opacities in the vitreous. No improvement followed treatment with mercury and potassic iodide. Finally acute iritis set in as a complication. The writer does not think that a direct toxic injury was produced by the salvarsan because it is known that neuritis following an injection retrogresses after a second injection, which contra-indicates a specific toxic action on the part of the drug. Forms of neuritis also appear after treatment with mercury, and as the patient had a recurrence in the skin the neuritis is to be considered as likewise a recurrence. But the destructive retinitis, the great amount of vitreous opacity, and the failure of the subsequent treatment with mercury contra-indicate a purely syphilitic recurrence. He is

rather inclined to think that the neuritis may have been a purely syphilitic recurrence, while the subsequent retinitis may have been induced by a newly established injury: the deposit of a large quantity of salvarsan injected subcutaneously.

MANZUTTO (7, **Effect of salvarsan upon some diseases of the eye**) comes to the following conclusions: (1) Impairment of the condition of the eye cannot be ascribed to the effect of the remedy in any of the cases treated with salvarsan. (2) Excluding gummata of the lids the best results are to be obtained in iritis and irido-cyclitis, in which the effect of the remedy can be perceived more quickly than is usual after treatment with mercury. (3) In neuritis or neuro-retinitis, the results are either nil, or at least no better than what may be expected from the ordinary mercurial treatment. (4) The results are nil in keratitis parenchymatosa due to hereditary syphilis, while, on the contrary, the result was good in a case of keratitis parenchymatosa in a woman with acquired syphilis.

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III.—REMEDIES AND INSTRUMENTS. Reviewed by Dr. HOEHMANN.

8. v. MENDE. **The local use of iothion in ophthalmology.** *Klin. Monatsblaetter f. Augenheilkunde*, xlix., 2, p. 647.

9. CECHETTO, E. **The use of scarlet red.** *Annali di Ottalmologia*, xl., fasc. 7, p. 502.

10. SABOWSKI. **Iontherapy or iontophoresis.** *Klin. Monatsbl. f. Augenheilkunde*, xlix., 2, p. 388.

V. MENDE (8, **Local use of iothion**) used a 1% ointment of iothion successfully in the cicatricial stage of trachoma both to clear up the pannus and against the cicatricial process in the conjunctiva, and also to clear up corneal cicatrices after ulcers and parenchymatous opacities.

CECHETTO (9, **The use of scarlet red**) obtained good results with scarlet red in superficial injuries of the cornea and also in deep ulcers, but noticed that it produced a dark red discoloration of the skin and conjunctiva

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SABOWSKI (10, **Iontherapy or iontophoresis**) applies to an ulcus serpens a minute electrode covered with cotton saturated with a $\frac{1}{3}$% solution of sulphate of zinc and passes

through it a current of 2 M. A. Later he used an ordinary electrolysis needle covered with a canula of platinum and iridium. Then he punctures the anterior chamber. He has not lost entirely a single eye. Cauterization was never needed.

Sections IV.–VII. Reviewed by Dr. ABELSDORFF, Berlin.

IV.—ANATOMY.

11. VAN DER HOEVE. **The color of the macula lutea.** *Arch. f. Ophthalm.*, lxxx., 1, p. 132.

VAN DER HOEVE (11, **Color of the macula lutea**) observed in a patient, who had been gored by an ox, ischæmia of the retina; the arteries were small, the retina was milky white, except that a small portion retained its normal red color to the temporal side of the papilla. Above the macula were little hemorrhages. The color of the macula was yellow in gaslight, electric light, and daylight. He thinks that several of the ciliary vessels were torn at the time of the injury and so the supply of blood to the chorioid was impaired. While otherwise the red color shines through the macula in acute ischæmia of the retina, the yellow color of the macula was rendered visible in this case by the anæmia of the chorioid.

V.—PHYSIOLOGY.

12. KLEIN. **The specific light of the retina and its phenomena.** *Archiv f. Anatomie u. Physiologie, Physiolog. Section*, p. 191.

13. HERTEL, E. **Biological questions of light.** *Zeitschr. f. Sinnesphysiologie*, xlvi., 5, p. 393.

14. RABINOWITSCH, F. **Research concerning the normal position of rest of the eyeball.** *Inaug. Dissert.*, Berlin, 1911.

15. WUECHODZEW, A. **The influence of the inclination of the head toward the shoulder upon the movements of the eyes.** *Westn. Ophth.*, 1911, Nos. 10 and 11.

16. PIGNATARI, R. **A difference between the two eyes in valuing the coloration of microscopic preparations.** *Rivista Italiana di Ottalm.*, vii., p. 178.

KLEIN (12, **The specific light of the retina and its phenomena**) maintains that the processes set up by light in the visual cells lead to nerve conduction and so to sensation only when they are intermittent and tetanic, while uninterrupted

light in the same strength does not lead to nerve conduction. The light which enters the eye is therefore broken up into little flashes by the layers of the retina which alternately absorb it and let it through. These layers coruscate intermittently. During the coruscation they absorb light and act as light upon the visual cells

HERTEL (13, **Biological questions of light**) established irritative effects upon living cells in the short-waved portion of the spectrum up to a wave length of 226μ. The conditions are more complicated on the long-waved side of the spectrum. An irritative effect was positively demonstrable with sufficient intensity up to 682μ; from 800μ upward the irradiated cells died; then with an increasing wave length of 1200μ up, irritative effects reappeared with a constant decrease of the energy necessary to produce them. From 2000μ up, the absorption by the water in which the cells were contained formed a very disturbing factor.

RABINOWITSCH (14, **Normal position of rest of the eyeball**) found by the examination of 372 patients that 25% of them had orthophoria, 46.3% esophoria, and 28.7% exophoria. The refraction and the age seem to exert no influence on the position of rest of the eye.

WUECHODZEW (15, **Influence of the inclination of the head toward the shoulder upon the movements of the eyes**) sums up the results of his work thus: (1) The inclination of the head to the right or left shoulder causes a uniform contraction of the binocular field of fixation. (2) This contraction becomes greater as the inclination of the head is increased. (3) The cause of this contraction seems to be the compensatory rotation of the eyes about the sagittal axis, whereby a change is produced in the relations between the points of attachment of the ocular muscles and a reduction of the mobility of the eyes. (4) The inclination of the head has no influence on the limits of the monocular field of fixation. (5) The explanation of this is that the single eye, not being influenced by the binocular act of vision, is free from the compensatory rotation. (6) The power of convergence decreases when the head is bent to the side in proportion to the degree of its inclination. This is explained by the depressing influence of the rotation upon

the muscular activity. (7) The horizontal divergence is reduced in the same way and for the same reason when the head is inclined to one side. (8) The positive vertical divergence, *i. e.*, the ability to raise the line of regard of the right eye higher than that of the left, increases with the inclination of the head to the left in proportion to its degree. (9) The negative divergence, *i. e.*, the ability to depress the line of regard of the right eye lower than that of the left, increases with the inclination of the head to the right in proportion to its degree. (10) This peculiarity of the vertical divergence is explained by the dependence of the retinal image upon the compensatory rotation of the eyes. (11) The ability of the eyes to rotate symmetrically about the sagittal axis seems to increase with the inclination of the head to the side.

PIGNATARI (16, **Difference between the two eyes**) instituted some experiments on a number of medical students who had perfect vision, the same condition of refraction in both eyes, and normal color sense. They were able to note distinctly better the details of the stain when they looked at microscopical preparations with their left eyes than when they used the right; the various tones of color were perceived with special fineness. Then if they used their right eyes there appeared to be a marked darkening of the colors, while the histological details became more distinct. He thinks this was not due to a dyschromatopsia, but to a difference in the light sense of the two eyes. With an excessive illumination the right eye becomes exhausted much quicker and the colors therefore appear to be less saturated, brighter, and mixed more with white.

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VI.—REFRACTION AND ACCOMMODATION.

17. FEILCHENFELD, H. **The operation for myopia.** *Berl. klin. Wochenschrift*, No. 35, p. 1598.

18. LEVINSOHN. **Operative treatment of regular astigmatism.** *Muench. med. Wochenschrift*, No. 49, p. 2613.

19. KADINSKY, M. W. **Temporary change of the refraction in diabetes mellitus.** *Westn. Ophth.*, 1911, No. 6.

FEILCHENFELD (17, **The operation for myopia**) has operated

on 11 eyes in 8 patients during the past twelve years. The myopia was over 16 D., with clear vitreous, good visual power of both eyes, but satisfactory correction was impossible. No complications or detachment of the retina occurred. The single discission should be extensive but superficial, then resorption is to be awaited, or its course cut short six or eight weeks later, in order to reduce the number of operations to the minimum.

LEVINSOHN'S (18, **Operative treatment of regular astigmatism**) patient had a vision of his right eye of $\frac{5}{15}$, with +2.5 cyl. $\frac{5}{5}$; of his left $\frac{5}{25}$, with +5. cyl. $\frac{5}{10}$. Objectively the astigmatism of the right eye was 3 D., that of the left 6 D.; the greatest curvature of the right 20°, of the left 10° outward and upward from the vertical. As the patient was a chauffeur and wished to have his vision improved without glasses, Levinsohn made an incision in the right cornea *2mm* from the limbus, and two grooves with the galvano-cautery at the upper and lower margins of the left. This resulted in a prolonged irritation but no improvement of the left eye, while, on the contrary, the vision of the right eye was improved to $\frac{2}{3}$ without glasses, $\frac{5}{5}$ with —1.5 + .75 cyl. Objectively the astigmatism had been reduced 1 D.

KADINSKY (19, **Temporary change of the refraction in diabetes mellitus**) describes a case of undoubted myopia in a man, 60 years old, in whom emmetropia and presbyopia suddenly appeared. Analysis of the urine revealed 7.4% of sugar. The myopia returned two months later, when the analysis of the urine showed only 1% of sugar.

VII.—MUSCLES AND NERVES.

20. TERRIEN and HUBERT. **Adjuvant treatment of strabismus.** G. Steinheil, Paris.

21. BARTELS, M. **Demonstration of paralyses of the ocular muscles in infants immediately after birth.** *Arch. f. Augenheilk.*, lxx., 1, p. 46.

22. SCHUR, M. **The eye symptoms in paresis of the cervical sympathetic.** *Zeitschrift f. Augenheilkunde*, xxvi., 4, p. 335.

23. MAGITOT. **Argyll-Robertson pupil and spasmodic meiosis from convergence—myotonic contraction.** *Archives d'opht.*, xxxi., p. 258.

TERRIEN and HUBERT'S (20, **Adjuvant treatment of strabismus**) work is suited not only for the physician, but also for the parents of strabismic children, to whom it makes clear

and understandable the way to carry out the orthoptic exercises prescribed. According to the experience of the writers, orthoptic exercises alone can, as a rule, cure strabismus divergens, and only exceptionally strabismus convergens, but when employed both before and after operation the result of this combined treatment in the latter is excellent. In every case the exercises demand an extraordinary degree of patience and attention not only on the part of the physician, but also on the part of the parents, so that the chances of success increase with the higher social position of the latter.

According to BARTELS (21, **Demonstration of paralyses of the ocular muscles immediately after birth**), if an infant is held upright with the head fixed by the observer and is then rotated about the axis of its body, the eyes will turn in the opposite direction. He reports the case of a child three days old in which when the body was rotated to the right the left eye never moved beyond the middle line while the right eye turned inward, showing that the left abducens did not act. He ascribes this paresis of the abducens to a nuclear hemorrhage induced by the difficult labor and long continued asphyxia. Many cases of so-called congenital absence of the abducens may be due to a nuclear hemorrhage with secondary degeneration of the nerve and muscle.

SCHUR (22, **Eye symptoms in paresis of the cervical sympathetic**) has studied 34 cases of paresis of the sympathetic, 14 of them repeatedly at intervals. Restitutio ad integrum took place in no case, but improvement was observed here and there. Thus in some cases a smaller difference between the pupils was present at a later examination. The retrogression was of only moderate degree and seen only in patients in whom the paresis has existed a long time, whence he concludes that a long time is needed for improvement, and that it results in a gradually arising contracture of the sphincter. In all the eyes examined with regard to the influence of sensory and psychic stimuli a dilatation of the pupil on the paretic side could be made out, one that was somewhat slower than that on the healthy side. This supports the view advanced by Braunstein, that the impulse to dilatation following these stimuli is conducted along the oculomotor tract to the iris, relaxes the tonicity of the sphincter, and so assists the action

of the dilatator on the sound side, which is weakened by the paresis on the other. A slight dilatation of the pupil is produced by instillations of cocaine, but as the sympathetic is paretic this cannot result from stimulation of the terminal filaments of that nerve in the dilatator, but must rather be ascribed to a relaxation of the tonicity of the sphincter by the drug, so that the natural elasticity of the iris produces a moderate dilatation of the pupil. To this should be added the contraction of the vessels of the iris. In 9 cases in which the paresis had lasted a long time an enophthalmos which was not present at the first examination was discovered at the second. This confirms the view of Moebius that the recession of the globe is one of the symptoms that is added to the others in the course of time, the same as the flattening of the affected side of the face. It is to be ascribed to atrophy of the orbital fat, as well as to paresis of the musculus orbitalis. Reduction of the intraocular tension was found in only two cases; the examination was made only with the fingers. No ground was discovered to show an influence on the refraction. The nine cases of enophthalmos had also a flattening of the cheek. He found no changes in the retinal vessels. Occasional cases of lachrymation he did not ascribe to the paresis, but is inclined to think it connected with slighter troubles of the affected eyes. No grounds for psychic changes were found.

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MAGITOT (23, **Argyll-Robertson pupil and spasmodic meiosis from convergence**) observed the rare phenomenon of spasm of the pupil after contraction to accommodation and convergence, which was named by Saenger myotonic contraction, by Donath bradycoria, in a patient 57 years old suffering from tabes. It was to be seen in only one pupil. This pupil contracted very slowly in convergence until it was half again as small as the other, so that it was almost punctiform. This maximal contraction of the sphincter persisted nearly 15 seconds and then the pupil gradually dilated until it reached its former size, Saenger's designation of this phenomenon as myotonic reaction indicates erroneously a pathogenetic connection with Thomsen's disease, with which it has absolutely nothing to do. It is rather a purely tabetic disturbance. The meiosis is not of spinal but of peripheral origin. The researches concerning

the anatomical basis of the Argyll-Robertson phenomenon show it to be due to a disease of the peripheral ciliary ganglion. Magitot thinks that the "myotonic reaction" is the consequence of a change in the ophthalmic ganglion, and in this way forms a support for the pathogenetic explanation of reflex pupillary immobility. The question why only the reaction of the pupil to light is abolished while its reaction to accommodation and convergence is preserved needs further anatomical study.

Sections VIII.-XII. Reviewed by Dr. SCHWEIGGER, Berlin.

VIII.—LIDS.

24. REITSCH, W. **Chronic purulent inflammation of the Meibomian glands due to capsule bacilli.** *Klin. Monatsbl. f. Augenh.*, xlix., p. 461.

25. v. MICHEL, J. **The nature of chalazion.** *Trans. of the Ophthalm. Society at Heidelberg*, 1911, p. 157.

26. WARSCHAWSKY, J. **Extirpation of the cartilage of the lid for trachomatous entropion.** *Klin. Monatsbl. f. Augenh.*, xlix., p. 490.

27. HIRSCH, CAMILL. **Combined Roentgen ray and radium treatment of carcinoma of the lid.** *Ibid.*, 1911, p. 201.

28. ROHMER. **A case of neurofibroma of the lid.** *Arch. d'ophtalmologie*, xxxi., p. 451.

REITSCH (24, **Chronic purulent inflammation of the Meibomian glands due to capsule bacilli**) observed a chronic inflammation of the Meibomian glands in a healthy girl, 10 years old. Fine pus threads twisted like corkscrews could be pressed from all the glands. No abscesses were formed. A bacillus capsulatus mucosus was found in the pus and also in the secretion of the nose. The affection was very persistent and extremely obstinate to all therapeutical efforts.

v. MICHEL (25, **Nature of chalazion**) says that the chalazion attests clinically its connection with the Meibomian glands, an acute inflammation of which is doubtless at the bottom of the trouble. The inflammation may become chronic and is much inclined to recur. It is due to no specific infection; most of the dwellers in the conjunctival sac can produce a chalazion-like inflammation of these glands. A chalazion is a granulation tumor of not uniform character. The foreign body giant cells are characteristic. It is situated in the loose connective tissue between the palpebral portion of the orbicu-

laris and the tarsus in the region of the Meibomian glands. It may get well, leaving a scar, but recurrences are frequent.

WARSCHAWSKY (26, **Extirpation of the cartilage of the lid for trachomatous entropion**) recommends Kuhnt's enucleation of the tarsus in entropion trachomatosum. He has employed it on 136 eyes, 13 times on the lower lid. The results were very good and he thinks it the best method of treating such an entropion of the lower lid.

HIRSCH (27, **Combined X-ray and radium treatment of carcinoma of the lid**) describes a very extensive carcinoma of the lower lid which encroached on the conjunctiva. Extirpation would have been difficult and would have left a large defect. Treatment with X-rays had a good effect on the skin affection but did not influence the carcinomatous portion of the conjunctiva at all. Then he used radium twice a week for an hour at a time, with the usual precautions, upon the ulcer in the conjunctiva. The cure was complete after the twelfth sitting. The result was very good both functionally and cosmetically.

ROHMER (28, **Neurofibroma of the lid**) had the opportunity to observe a case the first observation of which was published by Gross in 1882. At that time the patient was a young man, 18 years old, who had for twelve years noticed a tumor in the region of the right eye which was gradually increasing in size. The upper lid was almost as thick as a fist at the time of the first examination. A fairly large piece of the tumor was excised and the patient disappeared from under observation. Twenty-three years later he came under Rohmer's care. In the meantime the tumor had attained a very considerable size and the general condition of the patient was bad. The tumor had spread far over the adjacent portions of the head and face, and the lids, which were of the size of two mandarins, covered the eye so closely that it could not be seen. Fifteen days after an extensive excision of tumor tissue attended by a great loss of blood the patient died with symptoms of septicæmia and broncho-pneumonia. The microscopic examination showed that the tumor was a neurofibroma which had primarily developed in the form of concentric nodules about the nerves, and after degeneration of these had caused further trophic changes in the skin and bones of the

neighborhood. A satisfactory pathogenetic explanation could not be made. CAUSÉ.

IX.—LACHRYMAL APPARATUS.

29. THAYSEN, H. TH. E. **Lymphomatoses of the lachrymal and salivary glands.** *Ziegler's Beitraege*, l., No. 3.

30. BRIBAK, E. J. **Clinical and microscopical contributions concerning the frequency, as well as the diagnosis and treatment, of tuberculosis of the lachrymal sac.** *Klin. Monatsbl. f. Augenh.*, xlix., p. 747.

THAYSEN (29, **Lymphomatoses of the lachrymal and salivary glands**) distinguishes the following forms: (1) Simple lymphomatoses of the lachrymal and salivary glands which are confined to those organs. (2) Lymphomatoses which are associated with swellings of the lymphatic glands but without changes in the blood (pseudoleucæmic lymphomatoses). (3) Leucæmic lymphomatoses. (4) Lymphosarcomatoses. The accumulations of lymphocytes that form abundantly in the hilus of the gland play a part in the origin of these growths.

BRIBAK (30, **Tuberculosis of the lachrymal sac**) insists that tuberculosis of the lachrymal sac occurs much more frequently than has been supposed. It may be the only demonstrable tuberculous disease that the patient has. This can be determined histologically only by the examination of a series of sections, but clinically the absence of ordinary pus and the presence of a doughy resistance in the region of the sac, which does not disappear on pressure, is sufficient to excite suspicion of its presence. Tuberculin is of diagnostic value only when a local reaction takes place, yet he advises, whenever there is a positive general reaction and dacryocystitis is present, to extirpate the sac as soon as possible. The earliest possible diagnosis is of extreme value in the interest of a radical removal before the masses of granulations penetrate into the neighborhood. The only treatment is extirpation of the sac. He makes a large incision in the skin, curettes all of the wound with a sharp spoon, removes the diseased surroundings thoroughly, and then cauterizes the entire wound with the galvanic cautery. This is the only way to avoid recurrence and re-inoculation. The wound may then be closed and usually heals by first intention.

X.—ORBITS AND ACCESSORY SINUSES.

31. GINSBURG. **Pathogenesis of cryptophthalmos.** *Klin. Monatsbl. f. Augenheilkunde,* xlix., p. 211.

32. SATTLER, H. **Landstroem's muscle and its importance to the exophthalmos of Graves' disease.** *Ophth. Soc. of Heidelberg,* 1911.

33. AXENFELD, TH. **Endonasal treatment of orbital mucoceles, especially those of the ethmoid and lachrymal sac.** *Deutsche med. Wochenschrift,* 1911, p. 2115.

GINSBURG (31, **Pathogenesis of cryptophthalmos**) holds that cryptophthalmos originates from a disturbance in the normal development of the lens, which is not separated from the ectoderm and enveloped by the secondary optic vesicle at the right time, but remains in front of the latter. He maintains that all of the anatomical changes to be found in cryptophthalmos are made understandable by this hypothesis. The cause of the disturbance in the development of the lens is probably to be found in pathological heredity. Cryptophthalmos originates in the early embryonal period, latest at the end of the first month. Ginsburg's theory is new and at variance with all that have hitherto been held.

SATTLER (32, **Landstroem's muscle and the exophthalmos of Graves' disease**) discusses the question whether the so-called Landstroem's muscle takes part in the exophthalmos of Graves' disease. This muscle forms a cylindric ring, probably innervated by the sympathetic, arising from the septum orbitale and inserted into the equator of the globe. Its duty seems to be to keep tense the lateral cul-de-sacs of the conjunctiva, during the lateral rotations of the eyes. Sattler denies that this muscle has anything to do with exophthalmic goitre, not only on clinical and pathological grounds, but also because of the observation that exophthalmos is never observed after the instillation and subconjunctival injection of cocaine and adrenalin. Why should these drugs contract Mueller's palpebral muscle and not Landstroem's muscle? He is rather inclined to ascribe the exophthalmos to an increased accumulation of fluid in the orbit, to an œdema similar to that of the lids. It is possible that the overfilling of the orbital veins and a dilatation of the smaller arteries may play a part.

AXENFELD (33, **Endonasal treatment of orbital mucoceles**)

is convinced that mucoceles that protrude into the orbit may often be cured by an endonasal method and that such procedures are preferable. He has seen a suppurating lachrymal sac which was so ectatic that it could have been mistaken for a mucocele of the ethmoid. Purulent sacs are suited for endonasal treatment when the bony bed of the sac is much eroded and the nasal wall bends in on pressure upon the sac. In other cases he prefers extirpation of the sac through the skin.

XI.—CONJUNCTIVA.

34. PFALZ, G. **Traumatic conjunctivitis.** *Klin. Monatsbl. f. Augenh.*, xlix., p. 605.

35. GASTIEW, A. A. **Pyocyanasis and its effect in diseases of the anterior segment of the eye.** *Westn. Ophth.*, 1911, No. 10.

36. PASCHEFF, C. **The hæmatopoietic function of the conjunctiva.** *Meeting of the Heidelberg Ophthalm. Society*, 1911, p. 327.

37. SEEFELDER, R. **Involvement of the plica semilunaris in vernal catarrh.** *Klin. Monatsbl. f. Augenheilkunde*, xlix., p. 766.

38. AMSLER, C. **Clinical, bacteriological, and experimental studies of croupous conjunctivitis.** *Zeitschr. f. Augenheilk.*, xxvi., 1, p. 21.

39. SCHREIBER. **Teratoid osteoma of the conjunctiva.** *Meeting of the Ophthalm. Soc. of Heidelberg*, 1911.

PFALZ (34, **Traumatic conjunctivitis**) has determined from his studies of traumatic conjunctivitis that the hyperæmia of the conjunctiva that follows slight irritations is transient and needs no treatment, as it disappears very soon of itself. The same is true with regard to the inflammation caused by mechanical irritations or slight injuries of the conjunctiva and cornea. Persistence of the inflammation is always a sign that infection has taken place. The degree of conjunctivitis after chemical or thermic injuries is in proportion to their severity. After burns of the third degree he recommends early transplantation. After burns of the first and second degrees a hyperæmia of the conjunctiva remains, often permanently, as the result of a new formation of vessels which is functionally of no importance and is not amenable to treatment. In these cases astringents often create irritation. Pfalz warns against the danger of a treatment neurosis if treatment is too prolonged. He thinks it improbable that a traumatic conjunctivitis can ever present the picture of true

trachoma, though the possibility that an existing trachoma may be made worse by an injury must be admitted.

GASTIEW (35, **Pyocyanasis**) instituted a comparative treatment in 16 patients with various conjunctival troubles, instilling pyocyanasis freely into one eye three times a day and treating the other with the ordinary remedies. His observations show (1) that in acute catarrh and its complications the effect of pyocyanasis was good, but weaker and slower than silver nitrate, and in keratoconjunctivitis eczematosa or phlyctenulosa, than yellow ointment. (2) That pyocyanasis is a valuable remedy in cases in which silver nitrate and yellow ointment cannot be used. It can be placed in the hands of the patient as it is not poisonous and not irritating. (3) The weaker therapeutic effect of the drug is possibly due to its superficial action and the short time it remains in the conjunctival sac when used in the manner now employed.

HIRSCHMANN.

PASCHEFF (36, **The hæmatopoietic function of the conjunctiva**) found in pathological conditions of the conjunctiva not only newly formed lymphocytes and plasma cells, but also granular leucocytes, eosinophile cells, and fatty granular cells. He believes that he can conclude with absolute certainty from his findings that the eosinophile cells originate in the conjunctiva. The fatty granular cells are especially abundant in vernal catarrh. These researches would seem to settle the disputed question whether granular cells are formed only in the bone marrow, or in any lymphatic tissue.

Saemisch stated that the transition folds and the plica semilunaris are never involved in vernal catarrh, but SEEFELDER (37, **Involvement of the plica semilunaris in vernal catarrh**) reports a case in which the plica semilunaris was involved. The crescentic fold was thickened like a tumor and brawny. The microscopical examination revealed throughout the typical appearances of vernal catarrh. He is inclined to think that the disease of the plica may be one of the early symptoms of the disease.

AMSLER (38, **Croupous conjunctivitis**) reviews clinically, bacteriologically, and experimentally 129 cases of croupous conjunctivitis. He maintains that the distinction of croupous

from diphtheritic conjunctivitis should not be made in accordance with the bacteriological condition, as is usually done, but according to the clinical characteristics. Croup of the conjunctiva with Loeffler's bacilli usually runs a benign course under simple symptomatic treatment, while the presence of streptococci and pneumococci with or without diphtheria bacilli makes the prognosis considerably worse.

SCHREIBER (39, **Teratoid osteoma of the conjunctiva**) removed and examined a very rare tumor from the conjunctiva of a girl, 12 years old. It was as large as a cent, hard as cartilage, and situated between the insertions of the superior and external recti. The extirpation was easy. The clinical diagnosis made was that of a congenital lipodermoid containing cartilage or bone, but the histological examination proved it to be a teratoid osteoma. Cutaneous characteristics and fat were absent, while the tumor had the congenital origin and typical situation of the lipodermoid. Teratoid osteomata of the conjunctiva are extremely rare.

XII.—CORNEA, SCLERA, ANTERIOR CHAMBER.

40. MAGITOT. **Experimental researches concerning conservation of the cornea and keratoplasty.** *Annales d'oculistique*, cxlvi., p. 1.

41. REIS. **Congenital defect of Descemet's membrane.** *Meeting of the Ophthalm. Soc. of Heidelberg*, 1911.

42. TERTSCH, R. **A case of primary fatty degeneration of both corneæ.** *Klin. Monatsbl. f. Augenheilkunde*, xlix., xii., p. 1.

43. GEBB, H. **Treatment of pneumococcal infection of the cornea (ulcus serpens) with large quantities of serum.** *Deutsche med. Wochenschrift*, 1911, p. 2289.

MAGITOT (40, **Conservation of the cornea and keratoplasty**) obtained very satisfactory results from his experiments in conservation of the cornea. He was able to keep corneæ with normal transparency for more than twenty days. The best fluid to use is the hæmolytic serum of the same species of animal, probably because a certain amount of exchange of nutrition between the eyeball and the serum is then possible. Ordinarily the eyes are kept in toto, and then the unimpaired transparency of the media can be determined at any time. The proper temperature must be carefully maintained. The vitality of the conserved corneæ may be determined not only

from the macroscopical appearance, but also histologically and experimentally. When the graft is not faultless, when it has a little exfoliation of the epithelium and cloudiness of the parenchyma, it falls off of itself after 48 hours. On the contrary, if all signs of vitality are present it is adherent at the end of 24 hours. At no moment should the flap lose its transparency or show a loss of epithelium by means of fluorescin. The transplanted portions of cornea have the same transparency as originally present, and a comparison between grafts transplanted directly from one animal to another, and those from conserved corneæ show no clinical or histological difference. In two patients, who were exhibited five months after the operation, the place of transplantation could be recognized only from a slight opacity of the margins of the flaps and an irregular astigmatism which cannot usually be avoided. After five months more this could be perceived only with the aid of Placido's disk. If the transplantation fails, a dense white leucoma is formed. These clinical observations were confirmed by the histological examination of eyes 20 hours, 4 days, 7 days, 30 days, and 2 months after the operation. In the search for further signs of vitality, Magitot found on applying the galvanic current a slow, considerable dilatation of the pupil of the conserved eye, probably due to the greater power of resistance of the fibres of the sympathetic nerve. From his microscopic findings he concludes that an active process takes place in transplantation on the part of the grafted piece of cornea.

CAUSÉ.

REIS (41, **Congenital defect of Descemet's membrane**) describes the clinical and anatomical condition of a congenital defect of Descemet's membrane observed in an infant. Clinically there was a fine parenchymatous opacity of the cornea; nothing could be seen of the iris or pupil. Anatomically he found a circular anterior synechia with absence of Descemet's membrane and endothelium. Otherwise the eyeball was well developed. Aside from a marked ectopia of the pupil and some unimportant changes there were no other congenital anomalies. Inflammatory changes were absent.

TERTSCH (42, **Primary fatty degeneration of both corneæ**) observed this condition in a man, 32 years old. The progres-

sive course and the similarity of the picture to that of other certainly degenerative processes in the cornea showed that it was not a case of inflammation. The cause was doubtful. Probably it was a direct fatty breaking down of the lamellæ of the cornea. Such cases are extremely rare and none other without a preceding inflammation has been described. The pathology of the arcus senilis and Seefelder's marginal atrophy alone show certain points of resemblance.

GEBB (43, **Treatment of pneumococcal infection of the cornea with large quantities of serum**) finds that a much greater number of ulcera serpentia can be cured by the injection of large quantities of serum than by the use of smaller doses. He thus obtained good recoveries in 70% of 14 cases. Such patients were discharged at the end of nine days on the average. Such good results in the treatment of pneumococcal infection of the cornea suggests that larger quantities of serum might be tried in pneumonia than are now employed.

Sections XIII.–XVIII. Reviewed by Dr. NICOLAI, Berlin.

XIII.—LENS.

44. LAZAREW, E. **The origin of senile cataract.** *Westn. Ophth.*, No. 9.
45. STANCULEANU. **Intracapsular extraction of cataract.** *Meeting of the Ophthalm. Soc. of Heidelberg*, Aug. 8, 1911.
46. FEJER. **Extraction of cataract from an eye with congenital aniridia.** *Zentralbl. f. prakt. Augenheilkunde*, Nov., 1911, p. 324.
47. ORLANDINI. **Zonular cataract.** *La Clinica Oculistica*, Dec., p. 683.

LAZAREW (44, **Origin of senile cataract**) tested the theory of Golowin, Roemer, and Fraenkel by a series of experiments in which he (1) injected the blood serum of cataractous patients into the blood-vessels of rabbits; (2) injected the blood serum of cataractous patients into the anterior chamber and vitreous of rabbits, with simultaneous injection of the serum into the blood-vessels in some cases; (3) tried to elaborate actively lentotoxines and cyclotoxines by immunization of rabbits with the lenses and ciliary bodies of rabbits. An emulsion of rabbit lens in physiological salt solution was injected into the peritoneal cavity, and in many experiments entire lenses were introduced at the same time into the cellular tissue beneath the skin of the abdomen. During the period of immunization blood was taken to test for precipitation with lens albumin,

which was positive. In all three series of experiments the results as regards formation of cataract were negative. He concludes: (1) The presence of lens precipitates is demonstrable in the serum of immunized rabbits but lens amboceptors were not found; (2) lens amboceptors cannot be demonstrated in the serum of cataractous patients; (3) the experiments do not confirm either in general, or in detail, the theory propounded by Golowin, Roemer, and Fraenkel.

STANCULEANU (45, **Intracapsular extraction of cataract**) is not very well pleased with Smith's operation because he has seen it followed by hemorrhages, vitreous opacities, and pupillary disturbances. Smith's good statistics surely refer to the results immediately after operation. Sometimes the people do not return later even though troubles appear in their eyes. The author's method is simpler and easier of performance than Smith's.

FEJER (46, **Extraction of cataract from an eye with congenital aniridia**) reports a case in which the wound healed smoothly, but symptoms of dazzling were present from the start.

In some cases of zonular cataract the physician is often in doubt as to the choice of operation. ORLANDINI (47, **Zonular cataract**) has tried to solve the problem and comes to the following conclusions. Theory agrees perfectly with clinical observation that a degree of vision may be produced by means of iridectomy which is sufficient for ordinary purposes. Before performing an iridectomy the error of refraction must be corrected, especially when myopia is present, for on this depends the choice of operation. As the effect of the iridectomy is of special benefit for near vision it should be performed in the place where it will be most useful in reading, inward, or downward and inward. Great care is necessary with regard to the palpebral fissure.

CALDERARO.

XIV.—IRIS.

48. AXENFELD. **Special forms of atrophy of the iris.** *Meeting of the Ophthalm. Soc. of Heidelberg*, Aug. 5, 1911.

49. GALEZOWSKI and BERCHE. **Iridocyclitis after ovariotomy.** *Société d'Ophtalm. de Paris*, April 4, 1911.

50. OPIN. **Changes in the endothelium of Descemet's membrane in a traumatic irido-cyclitis.** *Archives d'ophtalmologie*, xxxi., p. 501.

51. KOBOSEW, J. A. **A foreign body in the iris for many years** *Westn. Ophth.*, 1911, No. 7.

AXENFELD (48, **Special forms of atrophy of the iris**) finds among the causes of a lessened capacity of the pupil to dilate: (1) A hyaline degeneration of the margin of the pupil so that the latter is made rigid. Such conditions have been described by Fuchs, Meller, and Seefelder, and have been found in blind or degenerated eyes. (2) Sometimes there are troubles in the dilatator caused by atrophy. (3) Signs of pigment atrophy may be seen at the pupillary edge of the posterior layer of the iris in senile cararact, and it is not certain that both of these things, the pigment atrophy and the cataract, have the same cause.

It seems to be doubtful if the case reported by GALEZOWSKI and BERCHE (49, **Irido-cyclitis after ovariotomy**) can be considered as due to an insufficient ovarial secretion, because a gonorrhœal infection was also present and the irido-cyclitis can be explained more simply.

Fuchs's opinion that the deposits on Descemet's membrane in irido-cyclitis are formed at first without changes in the membrane, and that the changes that appear are secondary, is correct in the majority of cases according to OPIN (50, **Changes in the endothelium of Descemet's membrane in traumatic irido-cyclitis**). Yet he seems to prove that in some cases the deposits are due to primary inflammatory changes in the membrane itself, by his findings in a case of serous character of traumatic origin, associated with secondary glaucoma. The eye was enucleated because of danger of sympathetic ophthalmia. He thinks the deposits were produced by proliferation of the endothelial cells caused by an inflammation of the membrane. Such a proliferation may lead through organization to the formation of a connective-tissue membrane on the posterior surface of the cornea, thus as it were doubling Descemet's membrane in the way described by Bartels. The pathological signs of inflammation of Descemet's membrane bear a close resemblance to those of the pleura and peritoneum, with which it is morphologically closely related. This condition would justify the old designation "Descemetitis" in many cases. CAUSÉ.

KOBOSEW (51, **Foreign body in the iris for many years**) reports a case in which a splinter of iron penetrated the eye nineteen years before. It had escaped notice in the course of an inflammation that lasted about six months and caused posterior synechiæ. Nineteen years later symptoms of irritation appeared. Examination revealed a deep anterior chamber, tremulous iris, synechiæ, coloboma of the iris, aphakia, opacity of the capsule, and a foreign body in the lower part of the pupil. When the magnet was approached to the eye the foreign body was drawn forward together with the iris. It was easily removed and proved to be an encapsulated piece of iron. Vision was fingers at five metres with + 12 D.

XV.—CHORIOID.

52. SCHIECK. **Experimental tuberculosis of the iris and chorioid.** *Deutsche med. Wochenschrift*, 1911, No. 16.

53. VILLARD. **Irido-chorioiditis following gastro-enteritis in young children.** *Archives d'ophtalmologie*, xxxi., p. 461.

54. LURIE, O. K. **Tuberculosis of the chorioid.** *Westn. Ophth.*, No. ii.

55. CACCHETTO, P. **Variations of the intraocular tension in sclero-chorioiditis posterior.** *La Clinica Oculista*, xii., p. 739.

SCHIECK (52, **Experimental tuberculosis of the iris and chorioid**) concludes that human tubercle bacilli produce in the anterior chamber of the eye of a rabbit nodules of the iris which undergo caseation before involution, the same as bovine. Tuberculosis of one eye protects the other from the same disease. Antibodies cannot be demonstrated in the aqueous, even in severe cases. Inoculation into the general circulation does not lead to virulent tuberculosis of the eye.

VILLARD (53, **Irido-chorioiditis following gastro-enteritis in young children**) has seen two cases in which a severe plastic irido-cyclitis followed a grave gastro-enteritis. One child was 3 years old, the other 4 months. The disease appeared in one eye at the height of the intestinal disturbance and caused its loss in each case by atrophy. Villard does not think that a metastasis took place, but believes that the ocular disease arose from the toxic products of the bacteria, which are very abundant in the stomach and intestines during the gastro-enteritis of children.

CAUSÉ.

LURIE (54, **Tuberculosis of the chorioid**) describes four cases of this nature: (1) In the form of disseminated white spots in both eyes of a man, 46 years old, with a family history of tuberculosis. (2) In the form of retinitis proliferans and yellowish white spots in the chorioid about the optic nerve of the right eye of a girl, 15 years old, coming from a healthy family. (3) In the form of retinitis proliferans in the right eye and partial exudative chorioiditis in the left of a student, 22 years old. (4) In the form of a neoplasm (glioma) in a child, 5 years old. The eye was enucleated and the diagnosis of tuberculosis was then made with the microscope. Taking these four cases in connection with twenty-five others that have been reported, the author concludes that tuberculosis of the chorioid appears in four forms, viz.: (1) Miliary, in miliary tuberculosis, with no inflammatory symptoms. (2) Chronic miliary tuberculosis, either associated with other foci in the organism or alone from a hereditary tuberculous taint. This form runs a very slow course, covering many years, and may result in retinitis proliferans and blindness, or may spread to the optic nerve. (3) Diffuse tuberculosis in the form of a chorioiditis or an irido-chorioiditis. This may present the picture of a pseudoglioma, or may pass over into retinitis proliferans. (4) Granuloma tuberculosum, presenting the clinical picture of a tumor, detachment of the retina, inflammation, hypotony.

CACCHETTO (55, **Variations of the intraocular tension in sclero-chorioiditis posterior**) has made a systematic study of the tension of eyes suffering from internal diseases, especially myopic sclero-chorioiditis, with Schioetz's tonometer, having in view treatment of the latter disease by repeated puncture of the anterior chamber. This instrument has hitherto been used almost exclusively in the study of the tension of normal eyes and to measure the increase of tension in glaucoma. He found in 50 normal eyes of persons from 20 to 30 years old, that the normal tension was 18*mm* of mercury, with a minimum of 17 and a maximum of 23; yet he does not think these figures absolutely correct, as an anomaly of tension cannot be inferred from a difference of several *mm* of mercury.

CALDERARO.

XVI.—VITREOUS.

56. ELSCHNIG. **Replacement of vitreous.** *Meeting of the Ophthalmic Soc. of Heidelberg*, Aug. 3, 1911.

ELSCHNIG (56, **Replacement of vitreous**) incises the conjunctiva, introduces a canula, evacuates the vitreous, replaces it with salt solution, and then sutures the wound. He has done this in 22 cases, in 15 for grave changes in the vitreous, in 6 for detachment of the retina, and once in a case of fresh injury. The operation was borne well as a rule; the best results were obtained in cases of hemorrhage into the vitreous.

XVII.—GLAUCOMA.

57. NOICZEWSKI. **Glaucoma simplex.** *St. Petersburger ophthalm. Gesellsch.*, Jan. 25, 1911.

58. BETTREMIEUX. **Simple sclerectomy in glaucoma.** *Arch. d'ophtalm.*, July–Sept., 1911.

The new theory of NOICZEWSKI (57, **Glaucoma simplex**) as to the origin of the glaucomatous excavation in glaucoma simplex, in which an increase of intraocular tension is often wanting, is that the lamina cribrosa is a movable membrane in the path of the exchange of fluid between the eyeball and the brain. An increase of pressure in the brain leads to a choked disk, and in the same way a diminution of pressure induces an excavation even when the tension of the eye is not increased. He has found confirmation of this theory in the results of his experimental trepanations of dogs.

BETTREMIEUX (58, **Simple sclerectomy in glaucoma**) designates as "simple sclerectomy" a pericorneal excision of not the entire thickness of the sclera, with or without puncture of the anterior chamber. He recommends it as the least interfering and least dangerous operation for glaucoma, which effects in many cases primarily a perfect reduction of the tension and can produce a good result even when iridectomy has been performed in vain. Bettremieux believes glaucoma to be a consequence of circulatory disturbances within the eye. The anterior ciliary veins are more numerous and take a more important part than has hitherto been thought. Correspondingly he thinks that the effect of this operation which does not open the anterior chamber is due to the relief

of the circulatory obstructions in the chorioid and ciliary body by easing the collateral outflow through these anterior blood channels. He does not believe the good effect is to be ascribed to a fistulous scar.

XVIII.—SYMPATHETIC OPHTHALMIA.

59. STOCK. **Benzo-salin and sympathetic ophthalmia.** *Klin. Monatsbl. f. Augenheilkunde*, Oct., 1911, p. 483.

60. DE RIDDER. **The action of salvarsan in sympathetic ophthalmia.** *Annales d'oculistique*, cxlv., p. 446.

STOCK (59, **Benzo-salin and sympathetic ophthalmia**) reports two cases of sympathetic ophthalmia in which he obtained good results from the use of benzo-salin. This preparation of salicylic acid can be given in as large doses as 20g, while aspirin and salicylate of soda must be given in smaller doses.

DE RIDDER (60, **The action of salvarsan in sympathetic ophthalmia**) has observed the beneficial effect of salvarsan in sympathetic ophthalmia and reports a case in which injections of pilocarpine were also made. A few cases prove nothing and less favorable results have been observed by others, but it must be admitted that the remedy helps in cases in which mercury would be of service, and mercury is generally of benefit in sympathetic ophthalmia.

Sections XIX.–XXI. Reviewed by Dr. H. MEYER, Brandenburg.

XIX.—RETINA AND FUNCTIONAL DISTURBANCES.

61. BERCHE. **Holes in the macula.** *Recueil d'ophtalm.*, xxxiii., p. 190.

62. ZEEMANN, P. **Hole and cyst formation in the fovea centralis.** *Arch. f. Ophthalmologie*, lxxx., p. 250.

63. RSCHANIZIN, A. **Rare changes in the fundus.** *Westn. Ophth.*, 1911, Nos. 7 and 8.

64. CORDS. **Juvenile diseases of the retinal vessels.** *Zeitschrift f. Augenheilkunde*, xxvi., p. 441.

65. KLEIN, A. **The spontaneous healing of malignant tumors with a noteworthy case of this nature of glioma retinæ.** *Nederlandsch Tijdschrift voor Geneeskunde*, vol. ii., No. 4.

BERCHE (61, **Holes in the macula**) contributes two new observations to the subject of "holes in the macula." In the first case a picce of metal passed through the upper lid and

lodged in the sclera of a workman, 35 years of age. The ophthalmoscopic examination on the day of the accident showed a diffuse milky-white opacity of the fundus without any change in the macula and with a great reduction of the vision. Eight days later a deep dark red spot was seen in the macula, surrounded by a dull red halo sprinkled with little yellow spots. Vision was $\frac{1}{10}$. Berche remarks that the origin of the hole could not be explained as due to laceration of the macula caused by contrecoup, because the weight of the foreign body after passing through the lid was not sufficient to produce such an effect. In the second case, a woman, 48 years old, the same clinical picture was produced in the course of a disseminated chorioiditis of unknown origin. The vision was only $\frac{1}{10}$. An absolute central scotoma was present in both cases. Of the two theories as to the pathogenesis of this affection, one, that of Menteith Ogilvie, is that the hole is produced in the macula by contrecoup, the other, that of Reiss and Fuchs, is that it is caused by an œdema of the retina at the posterior pole. Berche thinks the latter correct.

CAUSÉ.

ZEEMANN (62, **Hole and cyst formation in the fovea centralis**) concludes from his studies that there is a perifoveal zone in the retina which is particularly sensitive to harmful factors. This sensitiveness is the consequence of the relative blood supply. The tendency to formation of cysts in the vicinity of the fovea and at the ora serrata is an indication of this relatively imperfect vascularization. The temporal portion of the ora serrata is the most apt to be affected by the formation of cysts because of its greater distance from the central vessels. Perifoveal injuries which may be caused or favored by bad blood supply in this way may lead to the formation of holes. A true formation of a hole at the macula takes place either through a fusing of cystic hollow spaces, or through rupture in consequence of the cicatricial tension exerted by its immediate environment.

RSCHANIZIN (63, **Rare changes in the fundus**) observed, in the course of 1¼ years, in the left eye of a girl, 16 years old, a fluctuating ophthalmoscopic picture of the papilla and retina which he has not been able to find depicted in any ophthalmoscopic atlas, or described in literature. First an extensive

detachment of the retina was to be seen which disappeared after a few weeks, leaving no trace, but the region of the papilla then presented a very large, gray-white field with sharply defined margins, with the papilla itself in its lower-outer quadrant. There were also a couple of small exudates. Other changes followed one after another, for which reference must be made to the original. The vision fell gradually to 0. A neoplasm in the region of the scleral ring was suspected. Syphilis and tuberculosis were not established as present, but were not excluded. HIRSCHMANN.

On the basis of seven cases of juvenile disease of the retina, CORDS (64, **Juvenile diseases of the retinal vessels**) says that this may appear in such various forms as periphlebitis retinalis, recurrent hemorrhage into the vitreous, proliferations of connective tissue in the vitreous, and exudative retinitis, but is always due to damage of the walls of the retinal veins. In many cases a diagnostic or therapeutic reaction to tuberculin can be obtained and sometimes tuberculous processes are simultaneously present. Whether this vascular disease is caused only by tuberculosis, and why it attacks only young people, are questions that have not yet been answered. It is very rarely met with in grave cases of pulmonary phthisis and the cases in question are, in his opinion, to be looked upon as of avirulent tuberculosis. No indications of tubercular processes have yet been found anatomically.

KLEIN (65, **Spontaneous healing of malignant tumors**) enucleated the eye of a small child for glioma retinæ. The cut portion of the optic nerve was permeated with tumor cells. Some months later glioma appeared in the other eye and death was expected as certain. Yet the child did not die and there was no local recurrence at the site of operation. The second eye became totally atrophic, was removed when the child was 6 years old, and examined microscopically. It was much calcified and contained necrotic glioma tissue.

B. P. VISSER.

XX.—OPTIC NERVE.

66. DOLGANOFF. **Pregnancy as the cause of disease of the optic nerve and retina.** *Deutsche Med.*, p. 1893.

67. GOEBEL, C. **Treatment of tabetic atrophy of the optic nerve.** *Zeitschrift f. Augenheilkunde*, p. 206.

DOLGANOFF (66, **Pregnancy as the cause of disease of the optic nerve and retina**) reports a case in which a young woman was seized with neuro-retinitis and nearly blinded in the second half of her pregnancy. The condition improved under the administration of mercury and potassic iodide, the specific action of which is denied, until only a partial pale discoloration of the papillæ remained.

GOEBEL (67, **Treatment of tabetic atrophy of the optic nerve**) treated a patient with tabetic atrophy of the optic nerve with injections of strychnine, inunctions, and a form of suction massage. The result was very good: the visual field of one eye, which had become very contracted, returned to normal, while the other eye, which had already become blind, regained perception of light. The author strongly recommends the procedure followed by him.

XXI.—INJURIES, FOREIGN BODIES, PARASITES.

68. KRAUPA. **Erosio corneæ from a wasp sting in the lid.** *Zentralbl. f. Augenheilkunde*, 1911, p. 321.

69. PURTSCHER. **Erosio corneæ from a bee sting in the lid.** *Ibid.*, p. 361.

70. JESS. **Infection of a gunshot wound of the orbit with tetanus bacilli without the outbreak of tetanus.**

KRAUPA (68, **Erosio corneæ from a wasp sting in the lid**) reports a case in which the sting of a wasp passed through the lid and remained in place so that its point scratched the surface of the cornea and made an erosion.

A very similar case is the one observed by PURTSCHER (69, **Erosio corneæ from a bee sting in the lid**) in which the sting of a bee, or of a wasp, it is uncertain which, passed through the lid and eroded the cornea.

Tetanus was feared in a case of gunshot wound of the orbit described by JESS (70, **Infection of wound with tetanus bacilli without outbreak**). The danger was confirmed bacteriologically and experimentally, hence the entire orbit was opened freely and drained, tetanus antitoxin was injected several times and the field of operation flooded with it. The patient survived, but whether this was due to the free opening of the orbit or to the serum treatment, is uncertain.

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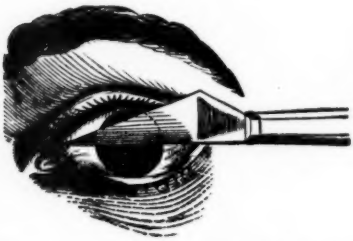

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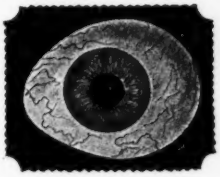

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